

Pervasive PSQL Vx Server 11

Product Guide

Guide to Using Pervasive PSQL Vx Server

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About This Manual

This manual contains content specific to Pervasive PSQL Vx Server and is provided for convenience of reference. Content for Pervasive PSQL Vx Server is also contained throughout the other documentation for Pervasive PSQL. Rather than sort through numerous pages, you can refer to specifics in this manual. Note that throughout the other documentation, all topics pertaining to Pervasive PSQL Server also apply to Pervasive PSQL Vx Server unless differences are explicitly called out.

Who Should Read This Manual

This manual provides information for users who install, configure, and run Pervasive PSQL Vx Server with hypervisor products.

Pervasive Software would appreciate your comments and suggestions about this manual. As a user of our documentation, you are in a unique position to provide ideas that can have a direct impact on future releases of this and other manuals. If you have comments or suggestions for the product documentation, post your request at the Community Forum on the Pervasive Software Web site.

Manual Organization

This manual is divided into the following chapters:

- Chapter 1—[Overview of Pervasive PSQL Vx Server](#)
This chapter introduces Pervasive PSQL Vx Server and discusses its basic features.
- Chapter 2—[Installing Pervasive PSQL Vx Server](#)
This chapter explains how to install Pervasive PSQL Vx Server.
- Chapter 3—[Pervasive PSQL Vx Server and Hypervisor Products](#)
This chapter discusses topics for using Pervasive PSQL Vx Server most effectively with hypervisor products.

The manual also includes an index.

Conventions

Unless otherwise noted, command syntax, code, and examples use the following conventions:

CASE	Commands and reserved words typically appear in uppercase letters. Unless you are working with Linux or the manual states otherwise, you can enter these items using uppercase, lowercase, or both. For example, you can type <code>MYPROG</code> , <code>myprog</code> , or <code>MYprog</code> .
Bold	Words appearing in bold include the following: menu names, dialog box names, commands, options, buttons, statements, etc.
Monospaced font	Monospaced font is reserved for words you enter, such as command syntax.
[]	Square brackets enclose optional information, as in <code>[log_name]</code> . If information is not enclosed in square brackets, it is required.
	A vertical bar indicates a choice of information to enter, as in <code>[file_name @file_name]</code> .
< >	Angle brackets enclose multiple choices for a required item, as in <code>/D=<5 6 7></code> .
<i>variable</i>	Words appearing in italics are variables that you must replace with appropriate values, as in <code>file_name</code> .
...	An ellipsis following information indicates you can repeat the information more than one time, as in <code>[parameter ...]</code> .
::=	The symbol <code>::=</code> means one item is defined in terms of another. For example, <code>a::=b</code> means the item <code>a</code> is defined in terms of <code>b</code> .

Overview of Pervasive PSQL Vx Server

1

An Introduction to Pervasive PSQL Vx Server and Its Basic Features

This chapter familiarizes you with Pervasive PSQL Vx Server and includes the following sections:

- [Pervasive PSQL Vx Server](#)
- [Operating Requirements](#)
- [Licensing](#)
- [Data Backup](#)
- [Hypervisor Products Compatibility](#)
- [FAQs About Pervasive PSQL Vx Server](#)
- [Definitions](#)

Pervasive PSQL Vx Server

In traditional computing environments every client and server is a separate physical machine. Such an environment is well suited for certain business models and will undoubtedly continue to serve as a desired configuration.

Increasingly, however, certain business situations are better suited to hypervisor products and an environment of virtual machines (VMs). For example, applications may need to support Cloud computing as well as full virtualization, partial virtualization, and paravirtualization.

Virtual Machine Environment

A highly virtualized environment requires a different set of features from other software products. Some of the features that are in place to support a traditional computing environment are simply inadequate for a VM environment. Operating conditions differ, with additional administrative challenges, and product licensing has unique requirements.

For these reasons, Pervasive Software provides Pervasive PSQL Vx Server, a product specifically designed for use with hypervisor products and VM environments. Pervasive PSQL Vx Server has no restrictions on hosting, connection pooling, Internet or intranet use. No additional license is required for use with hypervisor features such as live migration, failover, fault tolerance (FT), high availability (HA), and disaster recovery.

Physical Machine Environment

Pervasive PSQL Vx Server also runs on physical machines. For example, you may be planning to migrate from an environment of physical machines to a VM environment that provides live migrations. You can install Pervasive PSQL Vx Server on the physical machines initially and transition to VMs as your business needs change.

Operating Requirements

In a VM environment that supports live migration, an authorized Pervasive PSQL Vx Server instance—along with your application—can move from one host to another host with no impact to your end users. (Contrast this with a traditional client/server environment in which the physical server normally remains consistent. Clients may connect and disconnect, but they communicate with a dedicated server.)

Obviously, the operating requirements for Pervasive PSQL Vx Server must differ from those for Pervasive PSQL Server and Pervasive PSQL Workgroup because of fundamental differences between VM and traditional environments.

The following table explains the operating requirements for Pervasive PSQL Vx Server.

Table 1 Operating Requirements for Pervasive PSQL Vx Server

Machine Requirement	Discussion
Internet connectivity at all times	<p>Pervasive PSQL Vx Server periodically verifies that the key for the database engine is still valid. The validation requires Internet connectivity.</p> <p>You have 30 days to restore connectivity and re-validate the product if the network loses Internet connection.</p>
Consistent Hostname and Network Interface Card (NIC) MAC addresses	<p>An authorized instance of Pervasive PSQL Vx can be moved to a different physical machine, or converted into a VM, or migrated to a different VM host.¹ However the VM hostname and VM NIC MAC addresses must remain the same. If one of these must change, deauthorize the key for Pervasive PSQL Vx Server before performing the move, conversion or migration. See also FAQs About Hypervisor Products and Pervasive PSQL Vx Server Licensing.</p>
<p>¹ Each instance of Pervasive PSQL Vx Server, including those that are cloned or copied for VMs, requires its own permanent key even if the hostname and MAC addresses are the same. See also Licensing.</p>	

Licensing

This section explains the licensing for Pervasive PSQL Vx Server and contains the following topics:

- [License Model](#)
- [Status Codes Affected](#)
- [Utilities Affected](#)
- [Message Logging](#)
- [Access Methods Affected](#)
- [Application Changes Required](#)
- [Key Validation](#)

License Model

Pervasive PSQL Vx Server is designed to support highly virtualized environments. For instance, Vx Server includes support for Cloud computing (private, community, and hybrid), as well as for full virtualization, partial virtualization, and paravirtualization. Pervasive PSQL Vx Server has no restrictions on hosting, connection pooling, Internet or intranet use. No additional license is required for use with hypervisor features such as live migration, failover, fault tolerance (FT), high availability (HA), and disaster recovery.

The technological and operational differences that come with virtualized environments require a license model optimized for such environments. The user count license model used for Pervasive PSQL Server and Workgroup does not suffice. That model works well for traditional client/server applications in which many users or devices constantly add, update, and delete records from distinct individual desktops.

Instead, Pervasive PSQL Vx Server uses a license model that shifts the emphasis from how many users to how much work the database server processes. The model is based on capacity to accommodate license enforcement in virtualized environments. For example, each instance of Pervasive PSQL Vx Server has capacity limits on both the number of sessions in use and the data in use. (Also, each instance is identified by a virtual hostname and all virtual MAC addresses.)

Number of Sessions In Use (Session Count)

A “session” is defined as a client ID used by the transactional engine interface or a connection to the relational engine interface. “Client ID” is defined as a 16-byte structure that combines elements provided by the application, by the client platform, and by the database engine to uniquely identify a database transaction context.

The number of sessions in use is a count of the concurrent sessions. For brevity, “number of sessions in use” is also referred to “session count.” “Session count limit” is the maximum permitted number of concurrent sessions as granted by a license agreement.

Messages pertaining to session count are logged to the various Pervasive PSQL logging repositories. See [Message Logging](#).

The database engine uses various sessions for its own internal processes, such as for accessing Pervasive PSQL system files, metadata files, dbnames.cfg, and default system databases. These internal sessions do not consume any session counts.

Data In Use

“Data in use” is defined as the total size of all concurrently open data files. (A data file is a file created by an application to provide the data processed by that application.) “Data in use limit” is the maximum permitted amount of all concurrently open data files as granted by a license agreement.

The value for data in use increases when a data file is first opened. Subsequent opens to an already open data file do not add to the total. Data in use also increases if an open file increases in size. Operations on an already open file continue to be permitted even if the size of the open file increases beyond the data in use limit.

The value for data in use decreases when a data file is closed by the final user to have the file open. Since more than one user can access the same data file, *all* opens must be closed before data in use decreases.

Messages pertaining to data in use are logged to the various Pervasive PSQL logging repositories. See [Message Logging](#).

The database engine uses various files for its own internal processes, such as Pervasive PSQL system files, metadata files, dbnames.cfg, and default databases. Files used for internal processes do not increase the value for data in use.

Estimating Session Count and Data In Use

You may estimate the session count and data in use required for a given application as follows:

- Required session count equals the peak concurrent sessions the application uses times the peak concurrent instances of the application.
- Required data in use equals the cumulative peak physical file size of all data files concurrently open.

Pervasive Software provides a Web page to help you estimate session count and data in use. See www.pervasivedb.com. (Also note that the changes to Monitor help you estimate session count and data in use. See [Monitor](#).)

In general, for the transactional interface and the SDK access methods that use it, every unique client ID used to open a data file uses one session. If the same client ID is used to open all files, only one session count is consumed. If every file is opened with a distinct client ID, each open action uses one session count.

In general, for the relational interface and the SDK access methods that use it, every database connection with at least one table in use uses one session. A database connection without any tables in use does not consume any sessions. Once the database is connected and one session is counted, all subsequent operations on tables in that database are covered under that one session and do not use additional session counts.

Once a database file is open, certain SQL queries may involve other databases without consuming additional sessions. For example, if a query performs a JOIN with another database or builds a view that requires an underlying temporary table, no additional sessions are used. Note, however, that the additional open tables count toward total data in use.

Session Count, Data In Use, and Pervasive PSQL Utilities

To help you further estimate session count and data in use, the following table lists the Pervasive PSQL utilities that consume a session count. Only utilities that consume a session count are listed.

The increase in data in use depends on the size of the file being acted upon by the session.

Table 2 Session Count Used by Pervasive PSQL Utilities

Pervasive PSQL Utility ¹	Condition and Session Count Used ²
Bulk Data Utility (BDU)	One count for each table into which data is loaded. See bdu in <i>Pervasive PSQL User's Guide</i> .
DDF Builder	One count for every database connected to and one count if the "Create Table Definition" action is performed. These counts are released when DDF Builder is exited. See <i>DDF Builder User's Guide</i> .
Function Executor	One count for every unique client ID used by Function Executor. See Function Executor Concepts in <i>Advanced Operations Guide</i> .
Pervasive PSQL Control Center (PCC)	One count for each database opened by PCC. See Databases in <i>Pervasive PSQL User's Guide</i> .
Pvddl	One count for executing a script against a database. See pvddl in <i>Pervasive PSQL User's Guide</i> .
¹ Pervasive AuditMaster and Pervasive DataExchange, although not Pervasive PSQL utilities, each consume at most one session.	
² In all cases, the increase in data in use depends on the size of the file being acted upon by the session. Exact increases cannot be provided.	

Behaviors When Limits Are Reached

The following table summarizes the expected behaviors and suggested corrective actions when the limits are reached for session count and data in use.

Table 3 Expected Behaviors When Limits Are Reached for Session Count and Data In Use

Limit Reached	Behavior	Corrective Action
Session Count	<p>The database engine denies requests for <i>new</i> sessions and returns status code 161 to the application.</p> <p>Sessions established before the session count limit was reached continue to work and are not interrupted or disconnected.</p> <p>Messages pertaining to session count are logged to the various Pervasive PSQL logging repositories.</p>	<p>Apply an increase key for session count. An increase key can be applied at any time and does not require that you close sessions or stop the database engine. The increase is immediately available.</p> <p>You may try closing some of the current sessions. However, this action requires that you know which sessions are safe to close without resulting in incorrect data, incomplete records or aborted transactions.</p>
Data In Use	<p>The database engine denies requests for <i>new</i> file opens and returns status code 161 to the application.¹</p> <p>Subsequent opens to an already open data file are permitted. That is, if a file is already open and data in use reaches or exceeds its limit, other users can still access the open file.</p> <p>Note that data in use also increases if an open file increases in size. Operations on an already open file continue to be permitted even if the size of the open file increases beyond the data in use limit.</p> <p>The value for data in use decreases when a data file is closed by the final user to have the file open. Since more than one user can access the same data file, <i>all</i> opens must be closed before data in use decreases.</p> <p>Messages pertaining to data in use are logged to the various Pervasive PSQL logging repositories. For example, a message first alerts you when data in use reaches 90% of the data in use limit.</p>	<p>Apply an increase key for data in use. An increase key can be applied at any time and does not require that you close data files or stop the database engine. The increase is immediately available.</p> <p>You may try closing some of the currently open data files. However, this action requires that you know which data files are safe to close without resulting in incorrect data, incomplete records or aborted transactions.</p>
<p>¹ Status code 161 is returned if the file to be opened exceeds 110% of the data in use limit. A slight buffer above 100% is provided because an increase in data in use can also result from the growth of currently open data files.</p>		

Product Key and Increase Key

Because Pervasive PSQL Vx Server uses a capacity-based license model, it requires its own product key. You cannot authorize Pervasive PSQL Vx Server with a key for Pervasive PSQL Server or Pervasive PSQL Workgroup. Each instance of Pervasive PSQL Vx Server requires a key.

Session count and data in use are defined in the Pervasive PSQL Vx Server key issued by Pervasive Software or by an application vendor. Keys are available in various combinations of values for session count limit and data in use limit. See www.pervasedb.com for details.

Increasing the Value for Session Count or Data In Use

Pervasive Software or an application vendor offers a key to increase session count limit, data in use limit, or both. (Conceptually, the key is the same as a user count increase (UCI) key for Pervasive PSQL Server or Pervasive PSQL Workgroup.)

You immediately increase the value for session count limit, data in use limit, or both when you apply the key. A restart of the database engine is not required. A permanent key must be present to apply an increase key. An increase key cannot be applied to a temporary key.

If you delete the permanent key, all increase keys associated with that key are also deleted.

Note that the database engine logs a message to the Pervasive PSQL logging repositories when the limit increases for session count or data in use. The message contains the current limit and usage. See also [Message Logging](#). You can monitor the current, peak, and maximum values for session count and data in use with the Monitor utilities. See [Monitoring Database Resources](#) in *Advanced Operations Guide*.

Status Codes Affected

The wording, description, or both for the following status codes have changed to better address both license models (user count and capacity based).

- [161: A key has reached a maximum limit for user count, session count, or data in use, or has changed state to expired or disabled](#)
- [7064: No license obtained for the product](#)
- [7065: A product has not been obtained](#)

- 7102: Illegal license type is defined
- 7110: Only temporary licenses are installed on the system and all of them have expired
- 7124: An increase key for user count, session count, or data in use must have a vendor ID that matches the vendor ID of an installed permanent key
- 7125: A permanent license already exists
- 7126: Cannot increase the value beyond the maximum limit for user count, session count, or data in use
- 7475: Invalid value for user count, session count, or data in use
- -4838: A key has reached a maximum limit for user count, session count, or data in use, or has changed state to expired or disabled.

Utilities Affected

The following utilities have changed to accommodate a capacity-based license model.

License Administrator (GUI and CLI)

License Administrator displays the session count limit and data in use limit for a given key. You may also apply a key to increase the value for session count limit or data in use limit. A single increase key can increase both values depending on the key. See [License Administration](#) in *Pervasive PSQL User's Guide* for details.

Monitor

Monitor has the following changes pertaining to session count and data in use. The changes are summarized for the graphical user interface. The command line interface (bmon) contains similar changes where applicable. See [Monitoring Database Resources](#) in *Advanced Operations Guide* for details.

The changes to Monitor make it easier to estimate license requirements for session count and data in use. For example, Monitor displays the peak values for session count and data in use, and informs you how long the database engine has been running. Duration plus peak usage allows you to establish a more accurate baseline for estimating. When you estimate capacity, include the values determined from your peak conditions.

- The “Active Users” menu command and “MicroKernel Active Users” dialog have been renamed to “Active Sessions” and “MicroKernel Active Sessions,” respectively. The dialog has been modified to reflect session information.
- The “MicroKernel Resource Usage” dialog show the current, peak, and maximum values for user count, session count, and data in use. “Licenses in Use” has been removed.
- The “MicroKernel Active Files” dialog lists the physical file size in kilobytes (KB) for a given file.
- The amount of time in weeks, days, hours, and minutes that the database engine has been running (referred to as “MicroKernel Uptime”) is shown on the “MicroKernel Communications Statistics” dialog and on the “MicroKernel Resource Usage” dialog.

Message Logging

Messages pertaining to the capacity-based license model are logged to all of the logging repositories: Notification Viewer, PVSW.LOG, and the operating system event log. Any message logged to Notification Viewer is also logged to the operating system event log and to PVSW.LOG. Any message logged to the operating system event log is also logged to PVSW.LOG. If a message also includes a list of open files, the list is logged only to PVSW.LOG. See also [Pervasive PSQL Message Logging](#) in *Advanced Operations Guide*.

The database engine logs a message when the capacity increases or decreases for session count or data in use. The message contains the current capacity and usage. You can monitor the current, peak, and maximum values for session count and data in use with the Monitor utility. See [Monitoring Database Resources](#) in *Advanced Operations Guide*.

Session Count

All messages pertaining to session count are informational. Session count messages inform you when session count reaches its limit, when session count returns to an acceptable range after a period of time, and when session count capacity changes.

If the total number of active concurrent sessions equals the session count limit, the database engine denies requests for new sessions and returns status code 161 to the application. Established sessions continue to work and are not interrupted or disconnected.

When a session closes all of its file handles, session count is decremented. No Reset operation is required to decrement the session count. Note, however, that unless a session *is* reset, it remains visible in the list of active sessions in Monitor even though the session does not increase session count. See [Viewing Session Information](#) in *Advanced Operations Guide*.

Data In Use

Messages for data in use can be informational, warning, or error. When applicable, the messages advise you on corrective actions.

A message first alerts you when data in use reaches 90% of the data in use limit. This brings to your attention that data in use is approaching its limit and corrective action may soon be required. Additional messages—with escalating frequency—occur when the data in use limit reaches 100% or slightly exceeds 100%. (A buffer above 100% is provided because an increase in data in use can also result from the growth of currently open data files.)

For all of the message occurrences just discussed, the operation on the file is permitted. The messages are logged whether the file is first opened or already open and its size increases.

If the file to be opened exceeds 110% of the data in use limit, the database engine denies the open request and returns status code 161 to the application. The error message logged to PVS.W.LOG and to the operating system event log lists the name of the file, its size, and the data in use limit. Files already open continue to be available and access to them is not interrupted or disconnected.

Access Methods Affected

The following SDK access methods have changed to accommodate a capacity-based license model.

DTI

- The XML string that PvGetProductsInfo returns includes additional elements for session count, session count limit, data in use, and data in use limit. If the product is Pervasive PSQL Vx Server, the elements returned for user count and maximum user count are always zero. If the product is Pervasive PSQL Server or Workgroup, the elements returned for session count, session count limit, data in use, and data in use limit are always zero. See [PvGetProductsInfo\(\)](#) in *Distributed Tuning Interface Guide*.

- The PVMKDEUSAGEEX structure in monitor.h has been modified to include the following:
 - The current, peak, and maximum values for sessions and for data in use.
 - The duration, in seconds, that the database engine has been running (referred to as “engine uptime”).

The PVMKDEUSAGEEX structure is used by PvGetMkdeUsageEx. See [PvGetMkdeUsageEx\(\)](#) in *Distributed Tuning Interface Guide*.

- The PVFILEINFO structure in monitor.h has been modified to include the physical size in kilobytes of a file. This structure is used by PvGetFileInfo. See [PvGetFileInfo\(\)](#) in *Distributed Tuning Interface Guide*.
- The pserverClientType argument for PvGetEngineInformation returns two additional types: VXWIN_SERVER(6) and VXLINUX_SERVER(7). See [PvGetEngineInformation\(\)](#) in *Distributed Tuning Interface Guide*.

DTO

All of the changes to DTO apply only to DTO2. See [DTO2](#) in *Distributed Tuning Objects Guide*.

- The DtoMonitor object contains the following additional properties. See [DtoMonitor Object](#) in *Distributed Tuning Objects Guide*.

CurLicDataInUseMB	Returns the current value in megabytes (MB) of data in use.
CurSessionCountInUse	Returns the current number of sessions in use (the current session count).
EngineUpTimeSecs	Returns how long in seconds the database engine has been running.
MaxLicDataMB	Returns the maximum allowed size in megabytes (MB) for data in use (the data in use limit). The hex value 0xFFFFFFFF means unlimited.
MaxSessionCount	Returns the maximum number of sessions allowed by a license (the session count limit). The hex value 0xFFFFFFFF means unlimited.

PeakLicDataInUseMB	Returns the peak value in megabytes (MB) of concurrent data in use.
PeakSessionCountInUse	Returns the peak number of concurrent sessions in use.

- The DtoOpenFile object contains the following additional property. See [DtoOpenFile Object](#) in *Distributed Tuning Objects Guide*.

PhysFileSizeKB	Returns the physical size of the file in kilobytes (KB).
----------------	--

- The DtoEngineInformation object contains the following additional values for the ServerClientType property:
 - 6 = VXWIN_SERVER
 - 7 = VXLINUX_SERVER

See [DtoEngineInformation Object](#) in *Distributed Tuning Objects Guide*.

Application Changes Required

Typically, no application changes are required. If your application already works with Pervasive PSQL Server or Workgroup, it will also work with Pervasive PSQL Vx Server.

You need to revise your application if it uses DTI or DTO *and* you want to use the additional functionality for a capacity-based license model. See [Access Methods Affected](#).

Key Validation

Pervasive PSQL Vx Server periodically verifies that the key for the database engine is still valid. The validation requires Internet connectivity.

If the periodic validation determines that a key is invalid, the key changes state from “active” to “failed validation.” The database engine functions normally for 30 days so that you have ample time to correct the failures.

Because you need to attend to a failed validation in a timely manner, the state change of the key is brought to your attention as soon as possible through various logging repositories used by Pervasive PSQL Vx Server. See [Pervasive PSQL Message Logging](#).

If you do not correct the causes of the failed validation before the allowed period ends, the key changes state again to “disabled.” The key is no longer valid and the database engine cannot access data files.

For example, if the network loses Internet connection, you have 30 days to restore connectivity and re-validate Pervasive PSQL Vx Server. Pervasive PSQL Vx Server logs messages to various message repositories to inform you that Internet connectivity has been lost. If Internet connectivity is not restored within the allowed period, the Pervasive PSQL Vx Server key becomes disabled.

Data Backup

The chapter [Logging, Backup, and Restore](#) in *Advanced Operations Guide* discusses the data backup solutions provided with Pervasive PSQL. In addition to those solutions, Pervasive PSQL Vx Server includes the following:

- [Pervasive Backup Agent](#)
- [Pervasive PSQL VSS Writer](#)

If your backup software is *not* aware of the Microsoft Volume Shadow Copy Service (VSS), you can use Pervasive Backup Agent with your backup software. The VSS framework is included with Windows Server 2003 and newer operating systems.

If your backup software *is* VSS aware, Pervasive PSQL VSS Writer is automatically invoked during VSS backups. You do not need to use Pervasive Backup Agent if your backup software is already VSS aware.

Pervasive PSQL VSS Writer and Pervasive Backup Agent can be used together, but there is no advantage in doing so. Your backup process will be more streamlined if you select one method or the other.

Pervasive Backup Agent

Pervasive Backup Agent is an optional product included with Pervasive PSQL Vx Server. By default, it is not installed. If you want to install Backup Agent, you must install it from the Pervasive PSQL Vx Server media after you install Pervasive PSQL Vx Server. Select **Pervasive Backup Agent** on the installation selection dialog. No separate license for Pervasive Backup Agent is required if it is installed on the same machine as Pervasive PSQL Vx Server.

Pervasive Backup Agent provides a quick and simple method for you to set and manage continuous operations on your Pervasive PSQL database files. Setting and managing continuous operations is a critical piece when backing up your Pervasive PSQL databases without using Microsoft Volume Shadow Copy Service (VSS). 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.

Pervasive Backup Agent is compatible with many popular backup applications on the market. Note that the backup application must be able to issue commands to start and stop other applications (so that the commands can start and stop Pervasive Backup Agent).

For details on Pervasive Backup Agent, see *Pervasive Backup Agent Guide*.

Pervasive PSQL VSS Writer

The Microsoft Volume Shadow Copy Service (VSS) consists of Writer, Provider, and Requestor components. Pervasive PSQL Vx Server supports VSS with only a Writer component, Pervasive PSQL VSS Writer. Pervasive PSQL VSS Writer is a feature of the database engine and is available for use after Pervasive PSQL Vx Server is installed. Pervasive PSQL VSS Writer is available only on Windows operating systems.

(For more information on Volume Shadow Copy Service, refer to the Microsoft Web site document, *A Guide for SQL Server Backup Application Vendors*.)

Overview

During VSS snapshots, Pervasive PSQL VSS Writer quiesces all disk I/O *write* activity to all Pervasive PSQL data and transaction log files, regardless of the volume on which they reside. After the snapshot is taken, Pervasive PSQL VSS Writer allows all disk I/O to resume; this includes any writes that were deferred during the quiesced period.

Pervasive PSQL VSS Writer never quiesces disk I/O *read* activity allowing normal database processing to continue during the quiesced period as long as writes are not required. Pervasive PSQL VSS Writer operates normally during the backup phase, although performance will likely be reduced due to the backup activity of the VSS service and VSS Requestor.

The Microsoft Volume Shadow Copy facility allows Backup and Restore products to create a shadow copy for backup in which the files are either in one of the following states:

- 1 Well-defined and consistent state
- 2 A crash-consistent state (possibly not suitable for a clean restore)

Files in the VSS snapshot will be in the well-defined and consistent state if all of the following are true:

- 1 The file's writer is VSS-aware
- 2 The Backup and Restore product recognizes and notifies the VSS-aware writer to prepare for a snapshot
- 3 The VSS-aware writer successfully prepares for the snapshot

Otherwise the writer's files are backed up in the crash-consistent state.

VSS Writer Details

The following items discuss specifics about Pervasive PSQL VSS Writer.

- Supported Operating Systems

The same Windows operating systems on which Pervasive PSQL Server is supported also support Pervasive PSQL VSS Writer. The VSS framework is included with Windows Server 2003 and newer operating systems.

Pervasive PSQL VSS Writer is functional on the same bitness as the machine's operating system and the Pervasive PSQL installed. Pervasive PSQL VSS Writer (32-bit) is only supported on 32-bit machines, and 64-bit is only supported on 64-bit machines. If the bitness does not match, Pervasive PSQL functions properly, but the VSS Writer is unavailable.

- Supported Backup Types

Pervasive PSQL VSS Writer supports manual or automatic backups of data volumes. Pervasive PSQL VSS Writer is supported on Full and Copy Volume backups. Incremental, Differential, and Log backups are not supported. VSS recognizes Pervasive PSQL VSS Writer as a component. However, Pervasive PSQL VSS Writer does not support component backups. If the VSS Requestor does call Pervasive PSQL VSS Writer in a component backup, the VSS Writer performs the same actions as in a Full or Copy Volume backup.

- Virtualized Environment Support

Pervasive PSQL VSS Writer supports VSS Requesters that trigger VSS backups in virtualized environments. Performing a VM snapshot does not invoke a VSS backup.

- Multiple Volume Pervasive PSQL Data Files

Pervasive PSQL files and transaction logs may reside on multiple volumes. When backing up Pervasive PSQL files, remember that the transaction logs and related files on other volumes should be backed up simultaneously. Files that are independent of each other may not need to be backed up at the same time as non-related Pervasive PSQL files.

- Backup Solution Compatibility

To determine if a particular Backup and Restore product recognizes the Pervasive PSQL VSS Writer and that it will notify the writer to prepare for a snapshot, start a backup with the product. After the backup is in progress, consult the pvs.w.log to determine if the PSQL VSS Writer logged the Frozen or Thawed states. If the Backup and Restore product did not notify the PSQL Writer to prepare for the backup, another solution such as the PSQL Backup Agent must be used in order to backup PSQL data files in the well-defined and consistent state.

- Pervasive PSQL VSS Writer and Restore Operations

Stop the Pervasive PSQL services prior to performing a Restore operation with the Backup software. Failure to do so causes the VSS Writer to inform the VSS Requestor that it cannot participate in the restore. Transaction logs will need to be restored along with the data files to guarantee the integrity of the data. If Pervasive PSQL data and transaction log files are restored while Pervasive PSQL is running, the results are unpredictable and could lead to data corruption.

- Pervasive PSQL VSS Writer and Pervasive Continuous Operations

You may have an existing backup process that already uses Pervasive Continuous Operations or Pervasive Backup Agent. If you choose, you can continue to use that process with Pervasive PSQL Vx Server and Pervasive PSQL VSS Writer. Pervasive PSQL VSS Writer does not interfere with Continuous Operations or Backup Agent. However, there is no advantage to using *both* Pervasive PSQL VSS Writer and Continuous Operations (or Backup Agent) together. Your backup process will be more streamlined if you select one method or the other.

When Pervasive PSQL VSS Writer is called and files are in Continuous Operations, be aware that VSS Writer operates independently from any Continuous Operations. If files are in Continuous Operations when a VSS backup is in progress, view PVSU.LOG after the backup completes. Ensure that the Frozen and Thawed states completed successfully and that the data is in a well-defined and consistent state.

Also note that Pervasive PSQL VSS Writer requires the Microsoft VSS framework. Backup Agent does not use the Microsoft VSS framework. Consequently, Backup Agent does not participate in the backup when the VSS framework calls Pervasive PSQL VSS Writer and I/O operations are quiesced. Backup Agent must be separately added to the backup process. The backup process must also start and stop Backup Agent.

Hypervisor Products Compatibility

Pervasive PSQL Vx Server is compatible with the following products.

- VMware vSphere with vMotion and vLockstep
 - VMware Distributed Resource Scheduling
 - VMware High-Availability
 - VMware Fault Tolerance
 - VMware Site Recovery Management
 - VMware View
 - VMware ThinApp
- Microsoft
 - Hyper-V with live migration
 - App-V
- Citrix
 - XenServer with XenMotion
 - XenDesktop
 - XenApp



Note Although the list above was correct at the time of publication, the most current list is maintained on the Pervasive PSQL Web site (www.pervasedb.com). Check the list on the Web site for updates.

For details about each product, refer to the vendor's Web site. For topics on using Pervasive PSQL Vx Server most effectively with such products, see [Pervasive PSQL Vx Server and Hypervisor Products](#).

FAQs About Pervasive PSQL Vx Server

The following table lists frequently asked questions (FAQs) about Pervasive PSQL Vx Server.

Table 4 Frequently Asked Questions (FAQ) About Pervasive PSQL Vx Server

Question	Answer
Can I upgrade Pervasive PSQL Server or Workgroup to Pervasive PSQL Vx Server?	No. As a separate product, Pervasive PSQL Vx Server requires a full installation.
Can I authorize Pervasive PSQL Vx Server with a key for Pervasive PSQL Server?	No. Pervasive PSQL Vx Server requires its own key.
Does Pervasive PSQL Vx Server support telephone authorization or off-line authorization?	No. The utilities for telephone authorization and off-line authorization are not needed, or included, because Pervasive PSQL Vx Server requires Internet connectivity at all times.
Is Pervasive PSQL Vx Server available in a Workgroup version?	No. Pervasive PSQL Vx Server is available only in a Server version.
Can I run Pervasive PSQL Vx Server on a physical machine?	Yes. See Physical Machine Environment .
Can I concurrently install Pervasive PSQL Vx Server and Pervasive PSQL Server on the same physical machine or on the same VM?	No. They are separate products and cannot be installed on the same machine at the same time.
Does License Administrator identify Pervasive PSQL Vx Server as a separate product?	Yes. It is a separate product just as Pervasive PSQL Server and Pervasive PSQL Workgroup are separate products.
On what operating systems is Pervasive PSQL Vx Server available?	Pervasive PSQL Vx Server is supported on Windows and Linux operating systems. See the Pervasive PSQL Web site for details: www.pervasivedb.com .
Can Pervasive PSQL Vx Server be cloned or copied if my virtualization product supports these features for VMs?	Yes. Note that additional instances of Pervasive PSQL Vx Server, such as those for a copied or cloned VM, require their own license. See also Operating Requirements for Pervasive PSQL Vx Server .
Can Pervasive PSQL Vx Server be used with resource pools and templates if my virtualization product supports them?	Yes. See VM Resource Pools and Templates .

Table 4 Frequently Asked Questions (FAQ) About Pervasive PSQL Vx Server *continued*

Question	Answer
<p>Does Pervasive PSQL Vx Server 11 require Pervasive PSQL Vx Server 11 Clients?</p>	<p>No and Yes. Pervasive PSQL v10 Clients and Pervasive PSQL v11 Clients are fully compatible with Pervasive PSQL Vx Server, with two restrictions:</p> <ul style="list-style-type: none"> • The License Administrator provided with such Clients does not display all of the attributes of Vx Server licenses. • The API's of such Clients may consume more licenses (over count) for the same application usage that occurred with previous versions of Pervasive PSQL. <p>Because of the licensing differences with Pervasive PSQL Vx Server, Pervasive Software recommends that you use the Client that comes with Pervasive PSQL Vx Server (see also the following Note). This helps ensure that your applications correctly count licenses and allows you to monitor license compliance with License Administrator from the Client.</p> <p>Note: An update is available for Pervasive PSQL v11 Clients. If you apply the latest update, your applications correctly count licenses and you can correctly monitor license compliance with License Administrator from a Pervasive PSQL v11 Client. The update is available only for Pervasive PSQL v11, not products prior to Pervasive PSQL v11.</p>
<p>If my network loses Internet connectivity, does Pervasive PSQL Vx Server immediately stop working?</p>	<p>No. You have 30 days to restore connectivity and re-validate Pervasive PSQL Vx Server. Note that Pervasive PSQL Vx Server logs messages to various message repositories to inform you that Internet connectivity has been lost.</p>
<p>Does Pervasive PSQL Vx Server have its own product documentation?</p>	<p>Yes and no. Because Pervasive PSQL Vx Server is built on technology used for Pervasive PSQL, it shares much of the database functionality and documentation provided for Pervasive PSQL Server. Throughout the other documentation, all topics pertaining to Pervasive PSQL Server also apply to Pervasive PSQL Vx Server unless differences are explicitly called out. For convenience of reference, this manual, <i>Pervasive PSQL Vx Server Product Guide</i>, contains content specific to Pervasive PSQL Vx Server.</p>
<p>Where can I find out more about Pervasive PSQL Vx Server?</p>	<p>See all of the exciting information at www.pervasivedb.com.</p>

Definitions

Hypervisor products may contain terms with which you are unfamiliar. This section defines some of the more common terms, as well as terms specific to Pervasive PSQL Vx Server. It is to these definitions Pervasive PSQL Vx Server refers if the term is used in the Pervasive PSQL documentation.

Table 5 Terms Pertaining to Hypervisor Products and to Pervasive PSQL Vx Server

Term	Definition
Appliance	A physical machine running a hypervisor that hosts VMs.
Clone operation	A procedure that produces a VM with the same MAC addresses and system ID (SID) as the original.
Clone	A duplicate of a virtual machine. A full clone is a complete copy of the original virtual machine, including all associated virtual disks. A linked clone is a copy of the original virtual machine. The copy must have access to the parent virtual machine's virtual disks. A linked clone stores changes to the virtual disks in a separate set of files.
Converter	A tool for converting a physical machine image to a VM, or one VM format to another VM format. By default, a converted VM has a different MAC address, IP address, and system identifier (SID), but you can edit these properties on-the-fly during the conversion.
Copied VM	A VM is considered copied if it is modified as it is copied. The result is two differing VMs after copying.
Copy operation	A procedure that produces a VM with a different MAC address(es) and system ID (SID) from the original.
DPM	Distributed Power Management (DPM) is a feature offered by VMware, Inc. that saves power by dynamically right-sizing DRS cluster capacity according to workload demands. See also DRS .
DRS	Distributed Resource Scheduler (DRS) is a feature offered by VMware, Inc. that dynamically balances computing capacity across a collection of hardware resources aggregated into logical resource pools. DRS automatically allocates additional resources by redistributing virtual machines among the physical servers in the resource pool. See Resource Pool .
ESXi	An enterprise-level computer virtualization product offered by VMware, Inc. that runs directly on server hardware without requiring an additional underlying operating system.
EVC	Enhanced vMotion Compatibility (EVC) is a feature from VMware, Inc. that allows you to migrate VMs between different generations of CPUs.

Table 5 Terms Pertaining to Hypervisor Products and to Pervasive PSQL Vx Server *continued*

Term	Definition
FCoE	Fiber Channel over Ethernet (FCoE) is the standard for using Fiber Channel protocol over Ethernet networks.
FT	Fault Tolerance (FT) is the ability of a system to respond gracefully to an unexpected hardware or software failure. The lowest level of fault tolerance is the ability to continue operation in the event of a power failure. Many fault-tolerant computer systems mirror all operations in which every operation is performed on two or more duplicate systems, so if one fails the other can take over.
FT/HA	Fault Tolerance/High Availability. See FT and HA .
Full Virtualization	A type of virtualization in which the virtual machine simulates enough hardware to allow an unmodified guest operating system to be run in isolation.
Guest	The operating system that runs in a virtual machine. There can be multiple guests per hypervisor, but only one per virtual machine. See also Host .
HA	High Availability (HA) refers to the availability of resources in a computer system in the wake of component failures in the system. Availability refers to the ability of the user community to access the system, whether to submit new work, update or alter existing work, or collect the results of previous work.
Hardware-assisted Virtualization	A type of virtualization in which the hardware provides architectural support that facilitates building a virtual machine monitor and allows guest operating systems to be run in isolation. The most powerful form of virtualization since the hardware contributes in significant ways to improve the virtualization effort.
HBA	Host Bus Adapter (HBA) is an I/O adapter that sits between the host computer's bus and the Fiber Channel loop and manages the transfer of information between the two channels. In order to minimize the impact on host processor performance, the host bus adapter performs many low-level interface functions automatically or with minimal processor involvement.
Host	A computer that uses virtualization software to run virtual machines. Also called the host machine or host computer. The physical computer on which the virtualization software is installed.
Hypervisor	A platform that allows multiple operating systems to run on a host computer at the same time.
Idle state	A state in which a VM remains executing, but not actively online or performing real work. See also vLockStep .
Live Migration	The Microsoft term for moving the execution of the VM to a different appliance while the VM is still running without a dropped network connection or perceived downtime.
MAC address	Media access control (MAC) is a hardware address that uniquely identifies each node of a network.

Table 5 Terms Pertaining to Hypervisor Products and to Pervasive PSQL Vx Server continued

Term	Definition
Move operation	A action that involves moving the files that make up a VM from one location to another resulting in only one instance of the VM after the movement. Contrast with Clone .
OVF	Open Virtualization Format (OVF) is a packaging standard designed to address the portability and deployment of virtual appliances. Independent software vendors (ISVs) can use OVF to create a single, pre-packaged appliance that can run on customers' virtualization platforms of choice. See also The Distributed Management Task Force, Virtualization Management at http://dmf.org/standards/vman .
Paravirtualization	A type of virtualization in which the virtual machine does not necessarily simulate hardware, but instead, or in addition, offers a special API with which the guest operating system can makes special hyper-calls that ask the hypervisor to behave in non-traditional ways. For example, a paravirtualized environment can pretend to be running on completely different hardware than is actually available.
Partial Virtualization	A type of virtualization in which some but not all of the target environment is simulated. Usually, this means that entire operating systems cannot run in the virtual machine—which would be full virtualization—but that many applications can run. If certain hardware features of the target environment are not simulated, then any applications using those features will fail.
Physical Pervasive PSQL Vx Server	An instance of Pervasive PSQL Vx Server on a physical machine. See also Pervasive PSQL Vx Server Instance .
Pools	A logical grouping for access control, organization, and restriction of VMs. The VMs are already loaded, configured and authenticated; they're simply idle/suspended. Nothing about the VM is changed when it is started from a pool except possibly the appliance that is hosting it.
Pervasive PSQL Vx Server Instance	An installed Pervasive PSQL Vx Server on a physical or a virtual machine.
Quick Migration	The Microsoft term for suspending a VM, assigning it to a different appliance, then resuming the VM. Any connections to this VM are dropped.
Resource Pool	A logical abstraction for flexible management of resources ("resources" include CPU, memory, power, storage, and network resources).
Shadow Copy	A backup copy of selectable portions of data within storage arrays.
SRM	Site Recovery Manager (SRM) is a product from VMware, Inc. for disaster recovery that provides centralized management of recovery plans, enables non-disruptive testing, and automates site recovery and migration processes.
Storage vMotion	A product from VMware, Inc. that enables live migration of VM disk files across storage arrays (storage migration) with no interruption in service for critical applications.

Table 5 Terms Pertaining to Hypervisor Products and to Pervasive PSQL Vx Server *continued*

Term	Definition
Suspended state	A VM state in which the operating system and any running applications are halted in mid-execution so the data can be written to a suspend-state file. The suspended VM can be later resumed with all applications and data exactly where they were before the suspended state was initiated. A suspended state is very similar to the hibernate functionality provided by various operating systems.
Template	<p>A VM template provides a standardized group of hardware and software settings that can be used repeatedly to create new VMs configured with those settings. A new VM created from a template typically produces a different MAC address and system identifier (SID). Other configuration and software properties remain identical to the template's source VM unless you modify the properties during the template startup and creation of the new VM.</p> <p>Some hypervisor products also allow you to specify a run-once script to be invoked to handle any per-VM customizations. It is with a run-once script that you could invoke the Pervasive PSQL Vx Server <code>clilcadm</code> utility to authorize a key, for example.</p>
TrueCopy	A product from Hitachi Data Systems that provides continuous, nondisruptive, host-independent remote data replication for disaster recovery or data migration over any distance.
UCNA	Universal Converged Network Adapter (UCNA) is a high-performance Ethernet (10GbE) multi-function adapter from Emulex that provides optimized network and storage performance with protocol offloads for TCP/IP, TCP Offload Engine (TOE), Fiber Channel over Ethernet (FCoE) and iSCSI.
USP	Universal Storage Platform (USP) is the brand name for a Hitachi Data Systems line of enterprise storage arrays.
vLockStep	The technology behind VMware, Inc. Fault Tolerance that keeps two VMs synchronized.
VM	Virtual Machine (VM). A software implementation of a machine (a computer) that executes programs like a physical machine.
vMotion	A feature from VMware, Inc. that enables the live migration of running VMs from one physical server to another with zero downtime, continuous service availability, and complete transaction integrity.
XenMotion	A feature of the XenServer product from Citrix that allows live migration of running VMs from one physical host system to another without any disruption or downtime.

Installing Pervasive PSQL Vx Server

Instructions for Installing Pervasive PSQL Vx Server

This chapter lists the requirements and steps for installing Pervasive PSQL Vx Server, and contains the following sections:

- [Installation Requirements](#)
- [Upgrading to Pervasive PSQL Vx Server](#)
- [Installing Pervasive PSQL Vx Server](#)
- [After Installing Pervasive PSQL Vx Server](#)
- [Uninstalling Pervasive PSQL Vx Server](#)

Installation Requirements

The following topics apply to installation of Pervasive PSQL Vx Server on both Windows and Linux operating systems.

Before installing Pervasive PSQL Vx Server, Pervasive Software recommends that you review the release notes. They contain late-breaking news that could not be included in the user documentation.

No Other Pervasive PSQL Database Engine Installed

You cannot install Pervasive PSQL Vx Server on the same machine, physical or virtual, with Pervasive PSQL Server or Pervasive PSQL Workgroup. You must uninstall the other Pervasive PSQL database engine product before installing Pervasive PSQL Vx Server.

Internet Connectivity

The machine, physical or virtual, on which you install Pervasive PSQL Vx Server must have Internet connectivity. This is required for product authorization at installation time. Internet connectivity is also required for periodic product validation after installation. See [Operating Requirements for Pervasive PSQL Vx Server](#).

Pervasive PSQL Vx Server Key

Pervasive PSQL Vx Server requires a key specifically for that product. You cannot authorize Pervasive PSQL Vx Server with a key for Pervasive PSQL Server or for Pervasive PSQL Workgroup.

Access Rights

You must have full administrator-level rights on the machine where you install Pervasive PSQL Vx Server.

Related Requirements

Although not strictly required for installation, Pervasive PSQL Vx Server has operating requirements that go into effect immediately after installation. See [Operating Requirements for Pervasive PSQL Vx Server](#).

Upgrading to Pervasive PSQL Vx Server

No upgrade is allowed from Pervasive PSQL Server or Pervasive PSQL Workgroup to Pervasive PSQL Vx Server. You cannot install Pervasive PSQL Vx Server on the same machine, physical or VM, with Pervasive PSQL Server or Pervasive PSQL Workgroup.

Installing Pervasive PSQL Vx Server

This section explains how to install Pervasive PSQL Vx Server on Windows and on Linux.

If the installation fails for any reason, the installation log file for Windows platforms can be found in the Windows %Temp% directory. For Linux distributions, the standard Linux logging system is used for messages (as configured in /etc/syslog.conf).

Windows

The following steps explain how to install Pervasive PSQL Vx Server from its media using the default interactive installation.

➤ To install Pervasive PSQL Vx Server on Windows

- 1 Launch the installation program from your Windows machine.
 - a. Insert the Pervasive PSQL Vx Server media into the CD-ROM drive.
 - b. If the installation does not start automatically, click **Start** then **Run**, and type `drive:\autorun\autorun` where *drive* is the drive letter of your CD-ROM device.

The installation selection dialog displays.

- 2 Click the installation for the desired bit architecture (32-bit or 64-bit) of Pervasive PSQL Vx Server.

The installation program begins its initial preparation. After the preparation completes, the **Welcome** screen appears.

- 3 If prompted, close or uninstall any running applications that may interfere with the Pervasive PSQL installation.



Note If you wish to leave one or more programs running that *may* interfere, you must click **Ignore** to continue. Unpredictable results may occur during the Pervasive PSQL installation if you ignore programs that may interfere.

- 4 At the **Welcome** screen, click **Next**.

5 On the **License Agreement** page, read and accept the Software License Agreement, then click **Next**.

6 Select the setup type: **Complete** (default) or **Custom**.

The **Complete** setup (recommended for most users) installs all the Pervasive PSQL Vx Server components using the default options and locations.

- If you choose a **Complete** install, click **Next** and continue with step **10**.

The **Custom** setup (recommended for advanced users) allows you to specify the installation location, select the optional features and associated subfeatures to install, and determine the space requirements for the components.

- If you choose **Custom**, click **Next** and continue with the following steps.

7 To specify different installation locations, click **Change** for any of the folders listed, then enter or browse for a different folder. Click **OK** to accept the location.

8 Click **Next** to continue.

9 Select the optional features and associated subfeatures you want to exclude from the installation and click **Next**. All of the Pervasive PSQL optional features and subfeatures are selected for installation by default.

10 Click **Install** to begin installation.

11 A dialog displays when the installation wizard completes. The product has been installed with a trial key that expires at the end of its trial period.

You have two choices at this point: continue and authorize the product with a permanent key, or end the installation (and later authorize the product with a permanent key).

- If you choose to continue and authorize the product, click **Next** and continue with step **12**.
- If you choose to end the installation at this point, click **Next** then click **Finish** and skip to step **14**. (You may run the License Administrator utility at a later time to apply a key. See [License Administration](#) in *Pervasive PSQL User's Guide*.)

- 12 Enter your key and click the button to authorize it (an Internet connection is required).
- 13 A message box displays with the status of the authorization action. Perform one of the following actions depending on the status:
 - If the authorization status message is “**key is authorized,**” click **OK**, then click **Finish** to complete the installation.
 - If the authorization status message reports an error or warning, click **OK**, and repeat step 12, ensuring that you enter a valid license key.
 - If you are installing a trial download from the Pervasive PSQL Web site, you can authorize the product with the same key on two different machines, physical or virtual.
- 14 Register your product (recommended) as explained on the Registration page that displays, then close the Registration page.

If you are prompted to reboot your system, please do so in order to ensure proper operation of the product.



Note The installation program modifies some of the environment variables. On Windows platforms, environment variables are stored in the Control Panel under System information.

Utilities

Pervasive PSQL Vx Server does not install the utilities for telephone authorization and off-line authorization. They are not needed because Pervasive PSQL Vx Server requires Internet connectivity at all times.

Linux

Pervasive PSQL Vx Server may be installed on Linux using either the RPM or TAR format.

Installing Using RPM

The RPM format allows you to install Pervasive PSQL Vx Server if your Linux distribution contains the Red Hat Package Manager (RPM). Version 4 or greater of RPM is required.

Determine the package name to use for the installation using the following table and the distribution media.

Table 6 Pervasive PSQL Vx Server for Linux Package Names - RPM

Installation Type	Package Name
64-bit	Pervasive.SQL-Vx-yy.yy-zzz.zzz.x86_64.rpm
32-bit	Pervasive.SQL-Vx-yy.yy-zzz.zzz.i486.rpm

In all cases, the *yy.yy* designates a release number and *zzz.zzz* designates a build number. Refer to the distribution media for the actual name of the package.

The package manager copies all necessary files onto disk (default location is `/usr/local/psql`) and runs a post-installation script which performs the following tasks:

- Creates user `psql` and group `pvsw`
- Sets `user:group` ownership to `psql:pvsw` for the installed files
- Applies a trial license
- Creates a new ODBC DSN (data source name) for the DEMODATA test database
- If Samba configuration file is found
 - Creates a new Samba share PSQLDAPA
 - Creates a new Samba share PVPIPES
- Creates startup/shutdown scripts for Pervasive PSQL daemons
- Launches the Pervasive PSQL daemon (`mkded`)

➤ To install Pervasive PSQL Vx Server using RPM

- 1 Log in as the root user.
- 2 Assuming the RPM package is in the current directory, enter the following command:

```
rpm -ivh <Linux_Pervasive_PSQL_Vx_Server_Package_Name>
```



Note Refer to [Pervasive PSQL Vx Server for Linux Package Names - RPM](#) for the package name to use. You must include the appropriate release and build number information to perform the installation. Verify the complete package name from the distribution media.

If the RPM package is in another directory, preface the package name with a path.

- 3 Run the command line License Administrator utility to apply the key. See [License Administrator Command Line Interface](#) in *Pervasive PSQL User's Guide*. If you are installing a trial download from the Pervasive PSQL Web site, you can authorize the product with the same key on two different machines, physical or virtual.

Installing Using TAR

The tape archive (TAR) format allows you to install Pervasive PSQL Vx Server if you have a Linux distribution that does not support the RPM format or if you prefer not to use RPM. This section explains how to install Pervasive PSQL Vx Server using TAR.

The name of the Pervasive PSQL Vx Server installation package conforms to the following conventions.

Table 7 Pervasive PSQL Vx Server for Linux Package Names - TAR

Installation Type	Package Name
64-bit	Pervasive.SQL-Vx-yy.yy-zzz.zzz.x86_64.tar.gz
32-bit	Pervasive.SQL-Vx-yy.yy-zzz.zzz.i486.tar.gz

In all cases, the *yy.yy* designates a release number and *zzz.zzz* designates a build number. Refer to the distribution media for the actual name of the package.

➤ To install Pervasive PSQL Vx Server using TAR

- 1 Log in as the root user.
- 2 Change to the `/usr/local` directory.

```
cd /usr/local
```
- 3 Enter the following command to copy the tar into `/usr/local`.

```
cp <path_to_tar>/<Linux_Pervasive_PSQL_Vx_Server_Package_Name>.
```



Note Refer to [Pervasive PSQL Vx Server for Linux Package Names - TAR](#) for the package name to use. You must include the appropriate release and build number information to perform the installation. Verify the complete package name from the distribution media.

For example, if you downloaded the installation package into the `/home/bholly` directory:

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

- 4 Unpack the tar using the following command.

```
tar -xzf <Linux_Pervasive_PSQL_Vx_Server_Package_Name>
```

- 5 Change directories to the `/usr/local/psql/etc` folder where the installation scripts reside.

```
cd psql/etc
```

- 6 Run the pre-installation script:

```
sh preinstall.sh
```

- 7 Run the post installation script:

```
sh postinstall.sh
```

- 8 Run the command line License Administrator utility to apply the key. See [License Administrator Command Line Interface](#) in *Pervasive PSQL User's Guide*. If you are installing a trial download from the Pervasive PSQL Web site, you can authorize the product with the same key on two different machines, physical or virtual.

Utilities

Pervasive PSQL Vx Server does not install the utilities for telephone authorization and off-line authorization. They are not needed because Pervasive PSQL Vx Server requires Internet connectivity at all times.

Pervasive PSQL Client and Pervasive Backup Agent

See the following topics for how to install Pervasive PSQL Client and Pervasive Backup Agent. Note that Pervasive Backup Agent is an optional utility included with Pervasive PSQL Vx Server and is not installed by default.

Product	Windows Installation	Linux Installation
Pervasive PSQL Client	<p>Perform a Custom installation. See Installing the Pervasive PSQL Client for Windows in <i>Getting Started With Pervasive PSQL</i>.</p>	<p>See the following in <i>Getting Started With Pervasive PSQL</i>:</p> <p>Installing Pervasive PSQL Client for Linux - RPM</p> <p>Installing Pervasive PSQL Client for Linux - TAR</p>
Pervasive Backup Agent	<p>Install it from the Pervasive PSQL Vx Server media after you install Pervasive PSQL Vx Server. Select Pervasive Backup Agent on the installation selection dialog. No separate license for Pervasive Backup Agent is required if it is installed on the same machine as Pervasive PSQL Vx Server.</p> <p>See Step 6 under To install Pervasive PSQL Vx Server on Windows.</p>	<p>See the following in <i>Getting Started With Pervasive PSQL</i>:</p> <p>To install Backup Agent using RPM</p> <p>To install Backup Agent using TAR</p> <p>No separate license for Pervasive Backup Agent is required if it is installed on the same machine as Pervasive PSQL Vx Server.</p>

After Installing Pervasive PSQL Vx Server

The following topics are useful to review after you install Pervasive PSQL Vx Server.

Common Questions

You may have some general questions after you install Pervasive PSQL Vx Server. Some common questions are answered in *Getting Started With Pervasive PSQL*. The questions apply to all of the database engine products unless specific products are mentioned. See [Common Questions After Installing Pervasive PSQL](#).

Troubleshooting

In addition to general questions, you may have questions pertaining to troubleshooting. Two resources are particularly useful to help with troubleshooting: license administration utilities and the message logging repositories.

License Administration Utilities

The license administration utilities allow you to view and adjust the keys used to license the Pervasive PSQL products. For example, you can verify which keys have been applied, check the state of a key, and check the number of authorizations remaining for a key. For a detailed discussion of the utilities, and a list of the tasks that you can perform for license administration, see [License Administration](#) in *Pervasive PSQL User's Guide*.

See also [Session Count](#), [Data In Use](#), and [Pervasive PSQL Utilities](#) for information about License Administrator provided with different Client versions.

Message Logging Repositories

Messages logged by Pervasive PSQL Vx Server can be of type status, information, warning, or error, and can originate from any Pervasive PSQL Vx Server component. Certain messages specific to licensing issues originate only from the license administration components. In either case, Pervasive PSQL Vx Server logs messages to the following repositories:

- Pervasive Notification Viewer
- Operating System Event Log
- Pervasive PSQL Event Log (PVSU.LOG) (Windows only)

Any licensing message logged to Pervasive Notification Viewer is also logged to the Operating System Event Log and to Pervasive PSQL Event Log. Similarly, any licensing message logged to the Operating System Event Log is also logged to Pervasive PSQL Event Log. Note that the Operating System Event Log and Pervasive PSQL Event Log may contain detailed licensing messages not logged to Pervasive Notification Viewer.

Messages not specific to licensing are logged to the Operating System Event Log and to Pervasive PSQL Event Log.

Note that Pervasive Notification Viewer displays a message whenever a license is applied, including the temporary license that may be applied during installation. It is normal to see a notification during or immediately after installation when a license was applied.

Follow these guidelines for using messages to troubleshooting problems:

If you suspect a problem related to licensing, first check Notification Viewer, then check the Operating System Event Log and Pervasive PSQL Event Log. If you suspect a problem *not* related to licensing, check the Operating System Event Log and Pervasive PSQL Event Log. (If you check license information using the Pervasive PSQL license utilities, ensure that you use utilities that come with Pervasive PSQL Vx Server or contain the latest Client update. See also [Session Count](#), [Data In Use](#), and [Pervasive PSQL Utilities](#).)

For logging details, see [Pervasive PSQL Message Logging](#) in *Advanced Operations Guide*. For status code details, see [Status Codes](#) in *Status Codes and Messages*.

Uninstalling Pervasive PSQL Vx Server

The uninstall program removes the Pervasive PSQL engine, and all related components from your system that were added by the installation program, including registry settings, configurations and Pervasive PSQL system and sample databases.

The uninstall program does **not** remove the following:

- Pervasive PSQL Vx Server keys.
- Databases that you create under the Pervasive PSQL Vx Server installation directory.
- DSNs and database names associated with those databases.
- Databases in locations other than the Pervasive PSQL Vx Server installation directory.
- Other Pervasive PSQL products such as AuditMaster, Backup Agent, or DataExchange. Such programs have their own uninstall programs. Refer to the documentation for each product.

Uninstalling from Windows

- 1 Use a license utility (GUI or CLI) to delete the key that was used to authorize Pervasive PSQL Vx Server. This allows you to use the key for a different installation if you so choose. See [To Delete a Key](#) in *Pervasive PSQL User's Guide*, for example.
- 2 In the Windows Control Panel, select **Add/Remove Programs**.
- 3 Select the installed **Pervasive PSQL Vx Server** product from the list.
- 4 Click **Change** then **Next**.
- 5 Click **Remove** then **Next** and follow any prompts during the uninstall.

If prompted, close or uninstall any running applications that may interfere with uninstalling Pervasive PSQL.



Caution Unpredictable results may occur during the uninstall if you ignore programs that may interfere.

Reboot your system, if prompted to do so.

Uninstalling from Linux

The steps for uninstalling from Linux are slightly different for RPM and TAR. In either case, however, the uninstall program does **not** remove the system databases DEFAULTDB and SYSTEMDB nor the Pervasive PSQL Vx Server keys.



Note Before uninstalling, run the command line License Administrator utility to delete the key that was used to authorize Pervasive PSQL Vx Server. This allows you to use the key for a different installation if you so choose. See [To Delete a Key](#) in *Pervasive PSQL User's Guide*.

RPM

The following table lists the RPM commands to uninstall the various Pervasive PSQL Vx Server packages. You must log in as the root user using the “su” command before executing any of the commands.

Table 8 RPM Command to Uninstall Pervasive PSQL Vx Server Package

Pervasive PSQL Vx Server Package To Uninstall	RPM Command
32-bit or 64-bit	rpm -e Pervasive.SQL-Vx

TAR

The following table lists the shell scripts used to uninstall Pervasive PSQL Vx Server. You must log in as the root user using the `su` command before executing any of the commands.

Table 9 TAR Commands to Uninstall Pervasive PSQL Vx Server

Pervasive PSQL Vx Server Package To Uninstall	Script(s) To Execute ^{1,2}
32-bit or 64-bit	sh preuninstall.sh sh postuninstall.sh Note: The scripts must be executed in sequence: preuninstall first followed by postuninstall.
¹ Assumes that the scripts are executed from the directory where they reside: <code>/usr/local/psql/etc</code> ² You may want to remove the uninstall scripts themselves after the product is uninstalled. For example: <code>rm preuninstall.sh, rm postuninstall.sh, rm client*.sh</code>	

Pervasive PSQL Vx Server and Hypervisor Products

Tips for Using Pervasive PSQL Vx Server with Various Hypervisor Products

This chapter provides topics to help you use Pervasive PSQL Vx Server most effectively with a hypervisor product. The chapter contains the following sections:

- [Hypervisor Product Installation](#)
- [Usage Topics for Pervasive PSQL Vx Server](#)

Hypervisor Product Installation

As with any complex software, hypervisor products can be installed various ways, including with nonstandard and atypical configurations. For compatibility with Pervasive PSQL Vx Server, install and configure the hypervisor product using the best practices recommendations of the product vendor.

Usage Topics for Pervasive PSQL Vx Server

This section discusses the following topics for using Pervasive PSQL Vx Server:

- [Physical Machine To VM Migration](#)
- [Configuration](#)
- [VM Resource Pools and Templates](#)
- [Failover Cluster Support](#)
- [Performance](#)
- [Data Backup](#)

Physical Machine To VM Migration

You can install Pervasive PSQL Vx Server on physical machines initially and transition to VMs as your business needs change.

For migrations from physical machines to VMs, you must ensure that the MAC addresses and hostname remain the same and that Internet connectivity is maintained. Always document the MAC addresses for each NIC in your physical machine *before* performing the migration.

Some hypervisor migration utilities may automatically generate a new MAC addresses instead of letting you specify one. For such situations, you need to perform either of the following actions to ensure that Pervasive PSQL Vx Server runs on the VM.

- Change the MAC addresses in the VM to the value of the MAC addresses on the physical machine. Depending on the hypervisor product, you may need to edit the VM properties for each network adapter.
- Ensure that you deauthorize the Pervasive PSQL Vx Server key on the physical machine before performing the migration. See [To Delete a Key](#) in *Pervasive PSQL User's Guide*. Reauthorize the key on the VM after the migration is complete and you verify that the VM is working properly. See [To Apply a Key](#) in *Pervasive PSQL User's Guide*.

Pervasive PSQL Vx Server does not depend on IP address, but the VM itself might. Be aware that when a different MAC address is assigned to a network node, it is highly likely that the VM will be assigned a different IP address. If your VMs depend on raw IP addresses, or on the hosts file, rather than on the Domain Name

System (DNS), ensure that you also take appropriate actions concerning IP addresses.

Pseudo Interfaces

When you execute certain network commands such as “ipconfig/all” on Windows or “ifconfig -a” on Linux, you may see pseudo interfaces. For example, if you enable IPv6 on Windows, you can see the Teredo and ISATAP pseudo interfaces. On Linux, enabling IPv6 creates pseudo interface sit0. (Depending on the hypervisor product, you may also see pseudo interfaces on Linux such as vmnet0, vir0, vix0, or br0.)

If the pseudo interface does not have a MAC address (a physical address or an HWaddr), you can ignore the interface. Authorization of Pervasive PSQL Vx Server only involves interfaces that are assigned a MAC address.

Pervasive PSQL Vx Server attempts to determine which are real interfaces and which are pseudo interfaces. Hypervisor and platform vendors are making such a determination increasingly more difficult. If you encounter a situation where a pseudo interface is assigned a MAC address that you cannot specify or change, use the following steps.

- 1** Deauthorize the Pervasive PSQL Vx Server key. See [To Delete a Key](#) in *Pervasive PSQL User's Guide*.
- 2** Install, enable, disable, or remove any network service (such as IPv6) or interface (such as a NIC).

Note that MAC addresses are assigned when the underlying service or interface is created. Once created, they do not change.

- 3** Reauthorize the Pervasive PSQL Vx Server key. See [To Apply a Key](#) in *Pervasive PSQL User's Guide*.

The steps above apply to a permanent change to a VM. If you need to perform a temporary, short-term change to a network service or interface, you may skip the steps.

For example, suppose that you need to install an additional NIC for debugging purposes. Such an addition causes the Pervasive PSQL Vx Server key to change state to “failed validation.” For 30 days, Pervasive PSQL Vx Server functions normally while in failed validation state.

Once your debugging is completed, remove the additional NIC. With License Administrator, perform a validation action. See [To Perform a Validation](#) in *Pervasive PSQL User's Guide*. After the validation action, the Pervasive PSQL Vx Server key will change state back to “active.”

If the VM network services and interfaces are restored to their original configuration in 30 days or less, Pervasive PSQL Vx Server remains fully functional while in failed validation state. See also [Failed Validation and Grace Period](#) in *Pervasive PSQL User's Guide*.

Configuration

No special steps are needed to configure Pervasive PSQL Vx Server to use hypervisor product features such as live migration, fault tolerance, high availability, paravirtualization, resource scheduling and disaster recovery. Pervasive PSQL Vx Server remains authorized and fully functional provided that the MAC addresses and hostname remain consistent and Internet connectivity is maintained.

Certain scenarios, such as for disaster recovery, may require network and hardware changes. You may change the following without adversely affecting Pervasive PSQL Vx Server:

- IP address of the VM
- Hardware in the VM, such as CPU type, CPU speed, amount of memory, and type and size of storage.

Note that Pervasive PSQL Vx Server is not aware of certain hardware changes, such as increasing memory or physical storage, if the database engine is running. You must stop and restart the database engine if you want it to be aware of such changes.

VM Resource Pools and Templates

Pervasive PSQL Vx Server may be used with VM resource pools and templates. For both uses, each copy of Pervasive PSQL Vx Server requires its own product key. See [License Enforcement](#) in *Pervasive PSQL User's Guide*.

Resource Pools

Pervasive PSQL Vx Server must be authorized in each VM within a resource pool that includes the database engine. The VM must also meet the operating requirements for Pervasive PSQL Vx Server. See [Operating Requirements](#).

Templates

To authorize Pervasive PSQL Vx Server in a VM launched from a template, you may use a configuration script. The script can invoke the CLI License Administrator utility to authorize the Pervasive PSQL Vx Server key during the customizing of the guest operating system. Internet connectivity is required for the authorization. See [License Administrator Command Line Interface](#) in *Pervasive PSQL User's Guide*.

Remember to customize other properties of the guest operating system, such as hostname, that are independent of running Pervasive PSQL Vx Server.

Failover Cluster Support

Pervasive PSQL Vx Server does not support live migration of clustered VMs using Microsoft Cluster Server (MSCS). This is a limitation of MSCS, not Pervasive PSQL Vx Server.

As a general guideline, if you use affinity rules, ensure that all cores are running on the same socket. This aids performance of Pervasive PSQL Vx Server because of its multi-core support. Anti-affinity rules may also be used depending on your configuration.

If you use Raw Device Mapping (RDM) as the data drives for MSCS configurations, be aware of the considerations. Refer to the vendor documentation for RDM.

If you use fault tolerance/high availability with Distributed Resource Scheduler (DRS), be aware that load balancing can be done only after failover. Refer to the vendor documentation for DRS.

Performance

To achieve the best performance for Pervasive PSQL Vx Server, ensure the following:

- Adherence to the performance best practices recommendations from the hypervisor vendor.
- The VM hosting Pervasive PSQL Vx Server has ample memory (RAM).
- The hypervisor host has enough virtual CPUs to minimize virtual CPU contention among all of the VMs on the same machine. This prevents contention with the VM running Pervasive PSQL Vx Server. If you use affinity rules, ensure that all cores are running on the same socket.

- The Pervasive PSQL Vx Server data files reside on very fast physical storage and minimize spindle contention and controller contention for the physical storage device.

Data Backup

See [Data Backup](#).

FAQs About Hypervisor Products and Pervasive PSQL Vx Server Licensing

The following table lists frequently asked questions (FAQs) about hypervisor products and Pervasive PSQL Vx Server licensing.

Table 10 FAQs About Hypervisor Products and Pervasive PSQL Vx Server Licensing

Question	Answer
<p>When do I need to configure MAC addresses for Pervasive PSQL Vx Server licensing?</p>	<p>It is very likely VMs have the same MAC address if they result from the following situations:</p> <ul style="list-style-type: none"> • created from a clone • created from a template • converted from an existing VM • loaded as part of a vApp. <p>For these situations, you do not need to configure the MAC addresses for Pervasive PSQL Vx Server. However, note that each instance of Pervasive PSQL Vx Server requires its own permanent key even though the hostname and MAC addresses are the same.</p> <p>Therefore, deauthorize the Pervasive PSQL Vx Server product key before performing the situation described. Once the resulting VM exists, authorize each Pervasive PSQL Vx Server instance with a unique key. Invoking the Pervasive PSQL License Administrator can be done programmatically or manually depending on the hypervisor product. See your hypervisor documentation for details.</p> <p>If you convert a physical machine to a VM, the VM most likely will be assigned different MAC addresses than those for the original physical machine. If so, you must configure the MAC addresses to use Pervasive PSQL Vx Server. See How do I configure MAC addresses for Pervasive PSQL Vx Server licensing? and If I convert a physical machine to a VM, is the Pervasive PSQL Vx Server license still valid on the VM?</p>
<p>How do I configure MAC addresses for Pervasive PSQL Vx Server licensing?</p>	<p>Use the following information to assign static MAC addresses for a VM.</p> <p>On Windows</p> <p>See http://support.microsoft.com/kb/311272 for discussion of a tool.</p> <p>On Linux</p> <p>Use the following commands.</p> <pre>service network stop ifconfig eth0 hw ether <static MAC address you want> service network start</pre>

Table 10 FAQs About Hypervisor Products and Pervasive PSQL Vx Server Licensing continued

Question	Answer
<p>Can Pervasive PSQL Vx Server fail license validation after a VM is rebooted?</p>	<p>Yes. A reboot of a VM can result in the assignment of new MAC addresses. The VM may be set to automatically generate new MAC addresses.</p> <p>To prevent the assignment of new MAC addresses, assign static MAC addresses for the VM. See How do I configure MAC addresses for Pervasive PSQL Vx Server licensing?</p>
<p>If I convert a physical machine to a VM, is the Pervasive PSQL Vx Server license still valid on the VM?</p>	<p>Maybe. It depends on whether the conversion process allows you to specify static MAC addresses or the process automatically generates new MAC addresses.</p> <p>See Physical Machine To VM Migration and How do I configure MAC addresses for Pervasive PSQL Vx Server licensing?</p>

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