

## Pervasive PSQL Vx Server Licensing

### Overview

The Pervasive PSQL Vx Server edition is designed for highly virtualized environments with support for enterprise hypervisor features including live application migration (moving a virtual machine from one physical server to another while the application remains running), high availability and fault tolerance. As with other Pervasive PSQL products, it is licensed one instance per server (virtual or physical). Where Pervasive PSQL Vx is significantly different from other Pervasive PSQL products is that PSQL Vx licenses are priced by capacity, or how much work can be performed by the database. Capacity is measured by two factors: concurrent sessions (connections to the transactional or relational engine) and data in use (total size of the files opened by the database). Pervasive PSQL Vx is available in basic configurations – Small, Medium, Large and SuperSize. Session count and data in use limit increases are both available to allow customers to fine tune database capacity. And, unique to Pervasive PSQL Vx, time limited 60-day session count and data in use increases are available to provide an affordable way for customers to meet peak database demand requirements.

### What's New in Licensing for Pervasive PSQL Vx Server

Pervasive PSQL Vx licensing features were designed with two major goals in mind: 1) ensure that PSQL Vx authorization and validation processes enable customers to take advantage of enterprise hypervisor features and 2) offer a licensing model relevant to customers delivering applications in public, private or hybrid cloud environments. The following table highlights some of the differences between Pervasive PSQL Vx Server and Pervasive PSQL Server.

Feature	Pervasive PSQL Vx Server	Pervasive PSQL Server
Live Application Migration	Simple	Difficult
High Availability, Fault Tolerance	Requires single database license, automatic, uses hypervisor features.	Requires multiple database licenses, involves manual authorization and deauthorization.
Pricing Model	Database Capacity	Concurrent User
Time Limited/Peak Usage Pricing	Available	Not Available
Internet/Intranet Hosting License	Included	Additional
Machine Attributes Required for Validation	Virtual hostname and virtual MAC address	Multiple including: hostname, MAC address, memory, hard drive, CPU, OS and others
Internet connection required for ongoing validation	Yes	No
Failed Validation Time Period	30 days	14 days
Product Key Authorizations Allowed	10000 – More can be added by Pervasive Support	10 – More can be added by Pervasive Support

### Simplified License Management for Hypervisor Support

The first goal, supporting key hypervisor features, is met by adjusting the license validation process to focus on attributes that allow a VM with PSQL Vx to be migrated across physical machines when and as required by the hypervisor. Pervasive PSQL Vx uses the same basic methodology as other Pervasive PSQL products to authorize and validate instances of the database. A product key is authorized on a single machine which is identified by a set of hardware and software attributes. Unlike the standard version of PSQL Server which requires all machine attributes remain unchanged on a VM, Pervasive PSQL Vx license validation requires that only the virtual hostname and virtual MAC addresses remain unchanged. Once an instance of Pervasive PSQL Vx has been authorized on a VM, it can be moved throughout that hypervisor environment in support of whatever activity is occurring at the time: live migration as part of a failover, application deployment, hardware update, meeting increased capacity requirements or horizontal application scaling.

### Licensing Features for the Cloud

Cloud computing involves some key differences from classical client-server computing that are reflected in the PSQL Vx licensing model. The first is that virtual machines and hypervisors are a fundamental part of cloud computing infrastructure. Support of key hypervisor features is essential. The second is that cloud computing can make it difficult to count users – connection pooling through terminal services is common as is a stateless front end (browser) for many applications. So, the licensing model of concurrent users tied to a physical machine (classic client-server) is probably not the best fit for virtual machines or cloud based software. What’s needed is a licensing model that will work with the way enterprise hypervisors operate and support the business and technical realities of cloud computing. Pervasive’s solution is a capacity based licensing scheme for Pervasive PSQL Vx.

### Capacity Based Licensing

Capacity based licensing means charging for the amount of work that the database is able to do. For Pervasive PSQL Vx Server, the cost of the database license is determined by the number of concurrent sessions and the total size of open database files (data in use).

Pervasive PSQL Vx Size	Concurrent Sessions Limit	Data in Use Limit
Small	25	5 GB
Medium	100	20 GB
Large	250	50 GB
SuperSize	Unlimited	Unlimited

### Defining Session Count and Data in Use

Pervasive PSQL Vx Server licensing limits the total number of concurrent sessions and the total amount of data in use. A **Session is defined** as a client ID used by the transactional engine or a connection to the relational engine interface. Session count is increased whenever a unique client ID or connection to the relational engine opens a file or puts a table in use. If the file is already open or the table is already in use, the session count does not increase. **Data in use is defined** as the total size of all concurrently open data files. Session counts and data in use calculations do not include access to the database or files opened for the database’s internal processes such as Pervasive PSQL system files, metadata files, dbnames.cfg and default system databases.

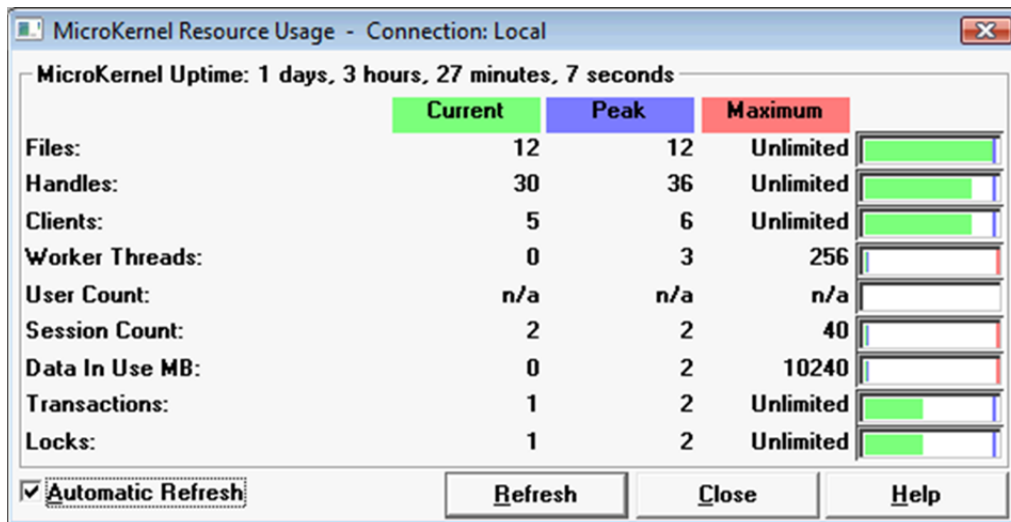
## Estimating Capacity Requirements

There are two methods of estimating capacity requirements for Pervasive PSQL Vx Server: 1) download a trial of PSQL Vx, run the application and review the data in the Monitor utility, or 2) use Monitor data from a production system to provide an estimate. In both cases, it is very important to collect data from a system that is running at or near the application's peak load.

### Estimating Capacity Requirements Using Pervasive PSQL Vx Server Trial Download

The best way to get a clear picture of an application's PSQL Vx capacity requirements is to download a trial copy of Pervasive PSQL Vx, run the application under conditions that simulate a full load and review the data collected by the PSQL Vx monitor utility. The updated version of the Pervasive PSQL monitor utility tracks peak values for session count and data in use for as long as the database engine has been running.

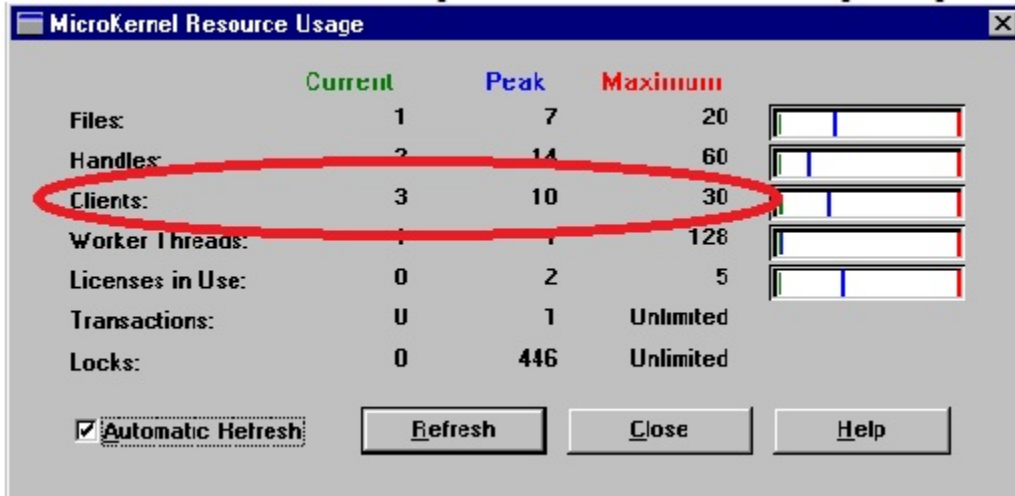
To view the peak values, launch the PSQL monitor utility and display Microkernel Resource Usage. From the screenshot below, we can see that the peak value for session count is 2 and the peak value for data in use is 2 MB.



In order to get an accurate estimate of PSQL Vx Server capacity requirements, it is very important during the test to simulate a production system at or near full load.

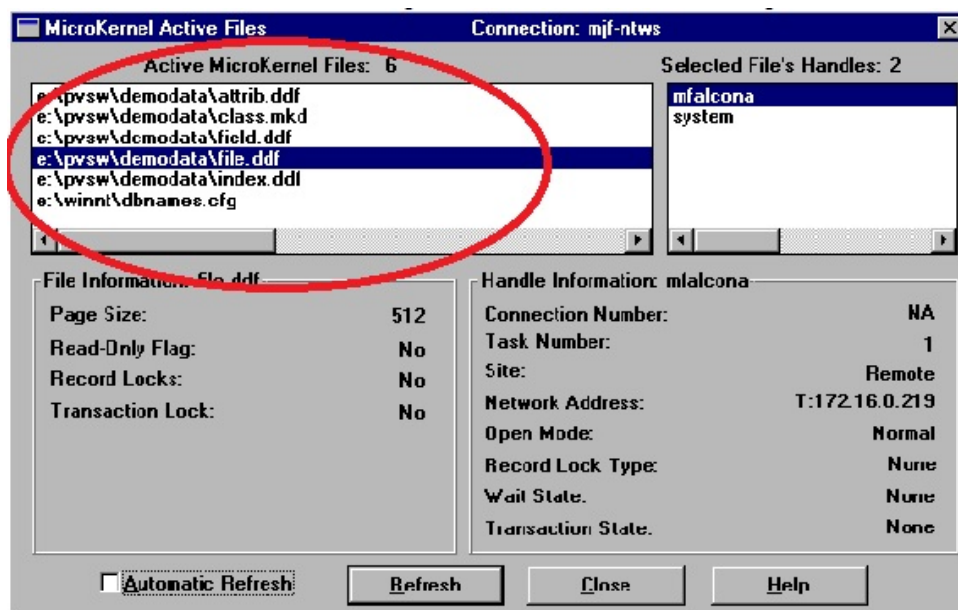
### Estimating Capacity Requirements with PSQL Monitor Prior to Version 11.12.xx

If a test environment is not available to estimate PSQL Vx capacity requirements, versions of Monitor prior to PSQL Vx can provide some insight into the application's PSQL Vx capacity requirements. MicroKernel Resource Usage in these versions of Monitor does include a peak number for clients. However, because the Clients metric includes connections used for internal database processes (for example, accessing PSQL system files) and these are not included in Session Count, **the number for Clients will always be higher than the Session Count.**



MicroKernel Resource Usage – Clients

The MicroKernel Active Files table includes a list of directories containing files that have been opened by the database. Calculating the total size of the files in these directories will provide an outside estimate of data in use requirements for Pervasive PSQL Vx. This is because Data in Use only includes opened files and does not include files opened for internal database processes. **Adding up the total size of files in directories listed in the MicroKernel Active Files table will typically deliver an inflated approximation of Data in Use.**



MicroKernel – Active Files

### Adding Capacity to Pervasive PSQL Vx Licenses

If database capacity requirements change over time, there are two ways to fine tune the license capacity: 1) add permanent data in use and/or session count increases and 2) add time limited data and session count increases.

### Permanent Capacity Increases

Permanent capacity increases allow customers to incrementally increase data in use or concurrent session count. Both types of license capacity increases can be purchased and added to the database separately.

Concurrent Session Count Increase	Data In Use Increase
10 Sessions	1 GB
25 Sessions	5 GB
50 Sessions	10 GB
	50 GB

### Time Limited Capacity Increases

Many businesses have cyclical peak demand. For example, retail businesses typically peak in the last two months of the calendar year and accounting businesses peak at the end of each calendar quarter and especially at annual tax time. If the peak demand is significantly higher than average demand, it may make sense to purchase time limited peak database capacity licenses.

Session Count Increase	Term	Data In Use Increase	Term
10 Sessions	60 Days	1 GB	60 Days
25 Sessions	60 Days	5 GB	60 Days
50 Sessions	60 Days	10 GB	60 Days
		50 GB	60 Days

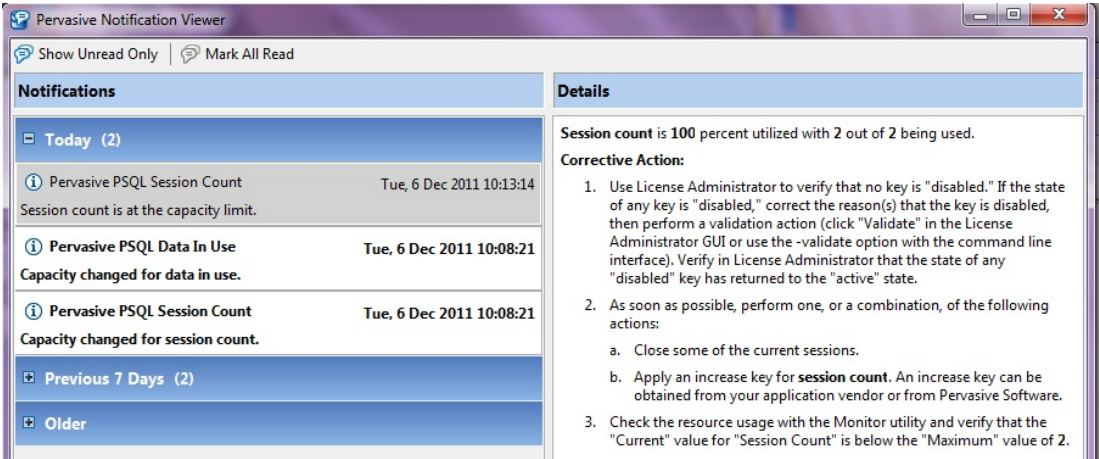
## Managing PSQL Vx Server Capacity Limits

The license for Pervasive PSQL Vx Server defines the number of concurrent sessions and amount of data in use for the database. When session count limit is met the database will continue to operate but will deny requests for new sessions. As the database approaches the data in use limit, the user will receive notifications at 90%, 100% and 110% of the licensed limit. Once the data in use reaches 110% of the licensed limit the database will not allow any new files to be opened. In both of these cases the database will return a status 161 (key has reached maximum limit for session count or data in use). The table below outlines expected behaviors as limits are reached and what corrective action to take.

Limit Reached	Behavior	Corrective Action
Session Count	<p>The database engine denies requests for new 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 discontinued.</p> <p>Messages pertaining to data in use are logged to the Notification</p>	<p>Apply a session count increase key. An increase key can be applied at any time and does not require that you close sessions or stop the database engine. Applying the increase requires an Internet connection for authorization.</p> <p>Session count can be decreased by logging some of the users off the system or closing instances of the application.</p>

	Viewer, the Pervasive PSQL Event log (Windows only) and the operating system event log.	
Data In Use	<p>Warnings are delivered via the Notification Viewer when the data in use reaches 90%, 100% and 105% of the licensed limit.</p> <p>When the data in use reaches 110% of the licensed limit the database engine denies requests for new file opens and returns status code 161 to the application.</p> <p>If a file is already open and data in use reaches or exceeds its limit, other users can still open that file. Once a file is open it can continue to grow in size without returning a 161 status code.</p> <p>The value for data in uses decreases when a data file is closed by the final user to have the file open.</p> <p>Messages pertaining to data in use are logged to the Notification Viewer, the Pervasive PSQL Event log (Windows only) and the operating system event log.</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. Applying the increase requires an Internet connection for authorization.</p> <p>Data in use can be reduced by logging some of the users off the system or closing instances of the application.</p>

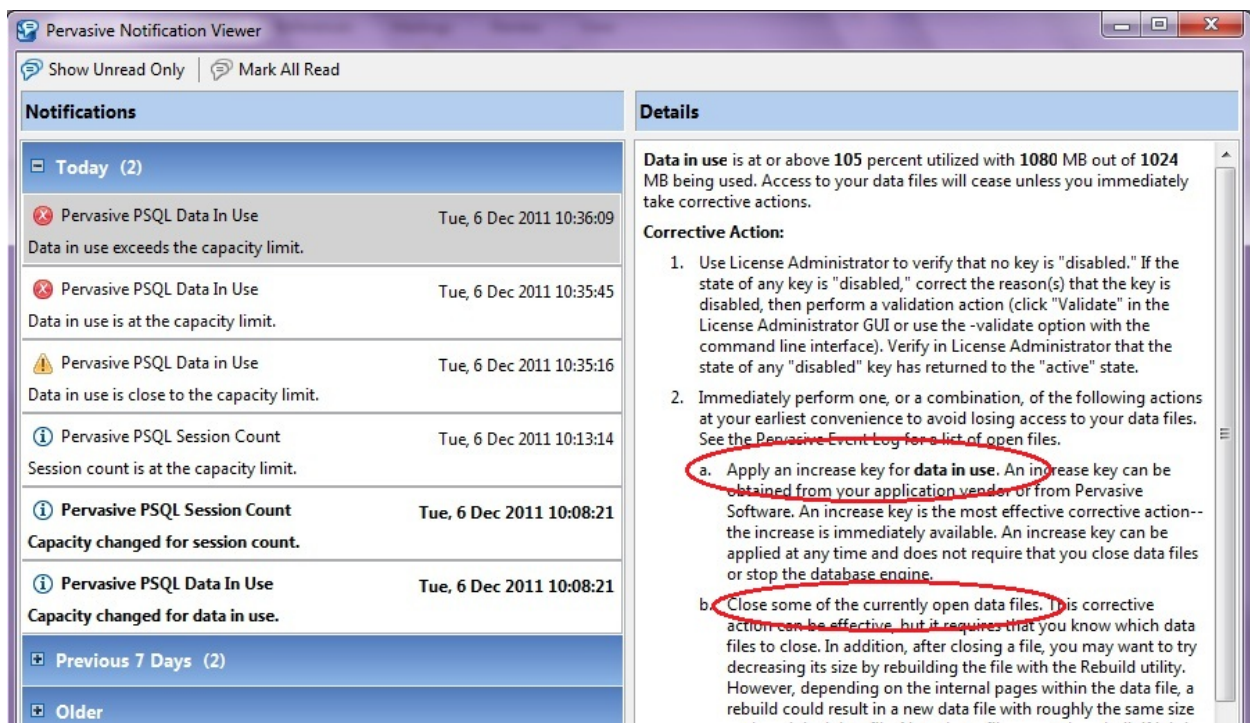
The following are screen shots of the Notification Viewer, error messages, and log entries recorded when Pervasive PSQL Vx reaches and exceeds the concurrent session and data in use license limits.



**Reaching 100% of Session Count Capacity**



**Error when trying to open a session past the current limit.**



**Notifications when reaching and exceeding data in use limit.**

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pvsrv - Notepad
File Edit Format View Help
-----
Computer Name Type Message
-----
ASHERWOOD-PROD I Session count is 100 percent utilized with 2 out of 2 being used. Apply an increase key for session c
ASHERWOOD-PROD W Data in use is 90 percent utilized with 927 MB out of 1024 MB being used. At your earliest convenient
ASHERWOOD-PROD W open files:
ASHERWOOD-PROD W C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\FORMIN.MKD 949060 KB
ASHERWOOD-PROD W C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\SHER_BILLING.MKD 56 KB
ASHERWOOD-PROD W C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\BILLING.MKD 392 KB
ASHERWOOD-PROD W C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\CLASS.MKD 132 KB
ASHERWOOD-PROD E Data in use is 100 percent utilized with 1028 MB out of 1024 MB being used. You risk losing access to
ASHERWOOD-PROD E open files:
ASHERWOOD-PROD E C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\FORMIN.MKD 1052800 KB
ASHERWOOD-PROD E C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\SHER_BILLING.MKD 56 KB
ASHERWOOD-PROD E C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\BILLING.MKD 392 KB
ASHERWOOD-PROD E C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\CLASS.MKD 132 KB
ASHERWOOD-PROD E Data in use is 105 percent utilized with 1080 MB out of 1024 MB being used. Access to your data files
ASHERWOOD-PROD E open files:
ASHERWOOD-PROD E C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\FORMIN.MKD 1105508 KB
ASHERWOOD-PROD E C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\SHER_BILLING.MKD 56 KB
ASHERWOOD-PROD E C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\BILLING.MKD 392 KB
ASHERWOOD-PROD E C:\PROGRAMDATA\PERSVASIVE SOFTWARE\PSQL\DEMODATA\CLASS.MKD 132 KB
ASHERWOOD-PROD E The file "C:\PROGRAM FILES (X86)\PERSVASIVE SOFTWARE\PSQL\BIN\FORMIN.MKD" could not be opened because

```

**Pervasive PSQL Log Entries**

The screenshot shows the Windows Event Viewer interface. The left pane shows 'Event Viewer (Local)' with 'Windows Logs' expanded to 'Application'. The right pane shows a list of events for the 'Application' source. The table below represents the data shown in the event viewer.

Level	Date and Time	Source	Event ID	Task Category
Error	12/6/2011 10:43:49 AM	Pervasive SQL	1000	Product Keys
Error	12/6/2011 10:38:37 AM	Pervasive SQL	1000	Product Keys
Error	12/6/2011 10:36:09 AM	Pervasive SQL	1000	Product Keys
Error	12/6/2011 10:35:45 AM	Pervasive SQL	1000	Product Keys
Warning	12/6/2011 10:35:16 AM	Pervasive SQL	1000	Product Keys

**Windows Event Viewer**

## Authorization and Validation for Pervasive PSQL Vx Server

The goal of the authorization process for Pervasive PSQL Vx Server is the same as for Pervasive PSQL – to ensure that users have valid copies of the software. However, because of the way Pervasive PSQL Vx is used and licensed there are some key differences in how the product is authorized and validated. Pervasive PSQL Vx Server requires an Internet connection during authorization and for ongoing license validation. Offline and telephone authorization are not supported.

### Periodic Validation Confirmation

Pervasive PSQL Vx Server will check daily to confirm that the product key is associated with the correct machine ID based on expected values for the virtual hostname and virtual NIC addresses. Pervasive PSQL Vx Server will also check each month to confirm that an Internet connection to the Pervasive licensing server is still available. If Pervasive PSQL Vx Server is unable to connect to the licensing server it will retry hourly until a connection is established.

### Failed Validation

If the validation checks can't be completed or if one or both of them fail, Pervasive PSQL Vx Server will enter a failed validation state for 30 days. If the product key is not validated in 30 days the product key will become disabled and the database cannot access any files.

### Pervasive PSQL Vx Server Product Key States

Pervasive PSQL Vx Server has three product key states:



- Active - Key is registered and live in the licensing database. No issue.
- Failed Validation - Key has a potential problem - usually related to changes to the virtual hostname or virtual MAC Address. Once the key is in the Failed Validation state, it enters a 30 day time interval where PSQL Vx Server will continue to operate. The product key cannot be deleted or deauthorized. If the issue is not resolved or the key is not repaired during the 30 days, the key will be Disabled.
- Disabled - The product key cannot be deleted or deauthorized and the database cannot access any files.

### Notification Viewer

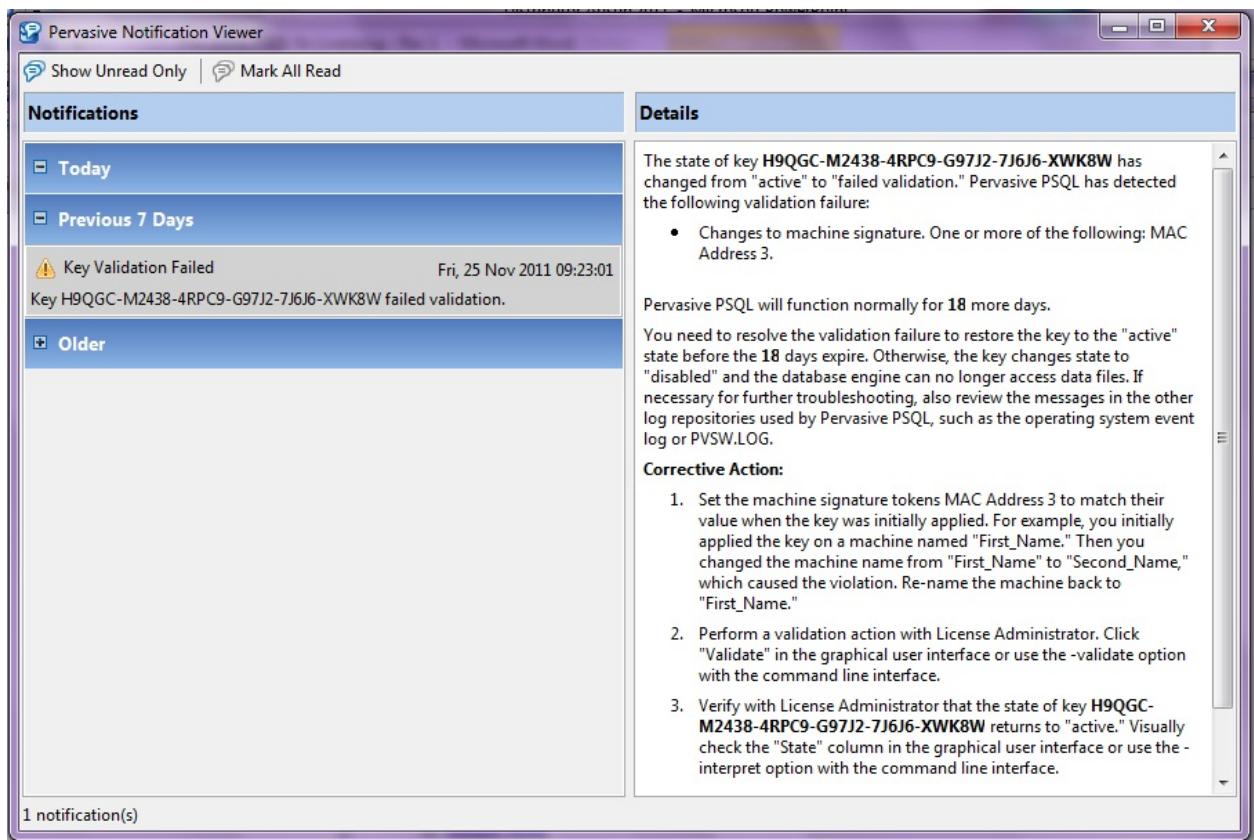
The Pervasive Notification Viewer is a Windows and Linux tray application that creates a notice whenever the product key state changes. Notices are repeated daily until the issue is resolved. The Notification Viewer also provides information about the reason for the validation failure and steps to take to resolve the issue.



Notification Viewer Normal



Notification Viewer Alert



Notification Viewer Details

### How to Resolve a Failed Validation Key State

There are two ways to return a key to the Active State once the validation check fails. The first option is to return the machine to its original state before the validation check failed (update the hostname

and/or MAC address) and restart the database engine. The second option is to contact Pervasive Support (or, if the copy of PSQL Vx was sold by a Pervasive OEM, contact the OEM) and ask to have the key repaired. Repairing the key puts it into a state where it can be deauthorized and reauthorized on the machine. In both cases it is a good idea to authenticate the key validation manually using the Validate button on the PSQL License Administrator.

### **Summary – Key Things to Remember About Pervasive PSQL Vx Server**

Pervasive PSQL Vx Server is a new, hypervisor-friendly edition of Pervasive PSQL. Because it is based on the standard version of PSQL v11 Server, applications that run on PSQL v11 will run without change on Pervasive PSQL Vx Server. The licensing model for PSQL Vx Server has been updated to be more in line with the requirements of highly virtualized environments and database applications deployed in private, public and hybrid clouds. Pervasive PSQL Vx Server requires no additional licenses for use with hypervisor features such as live migration, failover, high availability, fault tolerance and disaster recovery. It also requires no additional license to use the database in support of internal or external hosting and has no limits on connection or device pooling. However, these changes have implications for license purchase as well as the process of license authorization and validation. Capacity based licensing means that customers will need to evaluate database license purchases in a new way, including building into their calculations the ability to purchase time limited capacity to meet peak demand. Pervasive PSQL Vx Server is the first PSQL product requiring an Internet connection for ongoing operation. The overall effect of these changes will be to greatly improve the ability of the Pervasive PSQL Vx Server customer to take full advantage of the benefits of virtualization and to make development, deployment and support of cloud based database applications far simpler and more cost effective.