# IBM PowerVM Lx86 Release Notes for release 1.1.1.0

These release notes are for IBM® PowerVM Lx86 (System p™ Application Virtual Environment) for x86 Linux® release 1.1.1.0. They are a supplement to the IBM System p Application Virtual Environment for x86 Linux Administration Guide.

Note: Before using this information and the product it supports, read the information in the "Notices" on page 12.

This edition applies to the version 1.1.1.0 of IBM PowerVM Lx86 and to all subsequent releases and modifications until otherwise indicated in new editions.



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## Changes in this 1.1.1.0 update release since version 1.1.0.0

This update release adds new operating system support to the PowerVM Lx86 installer and updates the installer to use the new PowerVM Lx86 product naming scheme. RHEL 4.6 and SLES 9 SP4 are the newly supported operating systems.

More details about the newly supported operating systems and the new product naming scheme are covered later in these release notes.

## Product renaming to PowerVM Lx86

PowerVM Lx86 was known as System p Application Virtual Environment (System p AVE) in earlier releases. In this 1.1.1.0 release, product binaries, files and error messages still use the System p AVE, p AVE and p-ave naming conventions. The US English installer has been updated to use the new PowerVM Lx86 naming convention.

## PowerVM Lx86 CD and tar file structure

The PowerVM Lx86 CD structure is:

- p-ave-1.1.1.0-1.tgz
- powervm-lx86-release-notes-1.1.1.0.txt
- powervm-lx86-release-notes-1.1.1.0.pdf

The PowerVM Lx86 directory structure within the tar file is:

- p-ave-installer-1.1.1.0-1/installer.pl
- p-ave-installer-1.1.1.0-1/lib/
- p-ave-installer-1.1.1.0-1/resources/

- p-ave-installer-1.1.1.0-1/doc/

To install PowerVM Lx86, copy p-ave-1.1.1.0-1.tgz to the local machine before extracting it and then run the p-ave-installer-1.1.1.0-1/installer.pl script.

## Documentation location

The IBM System p Application Virtual Environment for x86 Linux Administration Guide and Release Notes can be found in the following location in the tar file:

```
/p-ave-installer-1.1.1.0-1/doc/
```

which is a symlink to /p-ave-installer-1.1.1.0-1/resources/doc/RO

After installation, the IBM System p Application Virtual Environment for x86 Linux Administration Guide and Release Notes can be found here:

```
<PowerVM Lx86 install location>/doc
```

which is a symlink to <PowerVM Lx86 install location>/installer/resources/doc/RO

## PowerVM Lx86 directory structure update

This is an update to the PowerVM Lx86 directory structure table in Chapter 5 on page 29 of the IBM System p Application Virtual Environment for x86 Linux Administration Guide.

*Table 1. PowerVM Lx86 directory structure*

| Directory | File or sub-directory | Description |
|---|---|---|
| <PowerVM Lx86 install location>/installer | installer.pl<br>lib/<br>resources/ | Local copy of PowerVM Lx86 installer<br>Auxiliary installer files and installer globalization text<br>Installer RPMs and, license files, and documentation |
| <PowerVM Lx86 install location>/doc | <Release notes><br><Administration Guides> | Symlink to the Release Notes and the PowerVM<br>Lx86 Administration Guide (all locales) |

## Installation media requirements update

This is an update to the installation media requirements in Chapter 5 on page 11 of the IBM System p Application Virtual Environment for x86 Linux Administration Guide.

For SUSE Linux Enterprise Server (SLES) 10 SP1, the installation requires the following CDs, DVD or ISO images:

SLES Version 10 SP1 for x86 CDs 1 - 4; an example is SLES-10-SP1-CD-i386-GM-CD{1-4}.iso

or

SLES Version 10 SP1 for x86 DVDs 1 - 2; an example is SLES-10-SP1-DVD-i386-GM-DVD{1-2}.iso

For Red Hat Enterprise Linux (RHEL) 4.6, the installation requires the following DVD or ISO images:

RHEL version 4.6 for x86 CDs 1 - 5; an example is RHEL4.6-i386-AS-disc{1-5}.iso

or

RHEL Version 4.6 for x86 DVD; an example is RHEL4.6-i386-AS-DVD.iso

For SUSE Linux Enterprise Server (SLES) 9 SP4, the installation requires the following CDs, DVD or ISO images:

SLES Version 9 for x86 CDs 1 - 4; an example is SLES-9-i386-RC5-CD{1-4}.iso

and

SLES Version 9 SP4 for x86 CDs 1 - 2; an example is SLES-9-SP4-CD-i386-GM-CD{1-2}.iso

**Disk space for SLES9 SP3**

- 3 GB disk space for software for a full installation; 600 MB disk space for software for a minimal installation
- 1 GB disk space for the /tmp directory for a full installation; 300 MB disk space for the /tmp directory for a minimal installation

**Disk space for SLES9 SP4**

- 3 GB disk space for software for a full installation; 600 MB disk space for software for a minimal installation
- 1 GB disk space for the /tmp directory for a full installation; 150 MB disk space for the /tmp directory for a minimal installation

**Disk space for SLES10**

- 3 GB disk space for software for a full installation; 900 MB disk space for software for a minimal installation
- 1 GB disk space for the /tmp directory for a full installation; 300 MB disk space for the /tmp directory for a minimal installation

**Disk space for SLES10 SP1**

- 3.2 GB disk space for software for a full installation; 900 MB disk space for software for a minimal installation
- 1 GB disk space for the /tmp directory for a full installation; 300 MB disk space for the /tmp directory for a minimal installation

**Disk space for Red hat Enterprise Linux (RHEL) 4.4, 4.5, and 4.6**

- 10 GB disk space for software for a full installation; 1.2 GB disk space for software for a minimal installation
- 2.4 GB disk space in the /tmp directory for a full installation; 400 MB for a minimal installation

## Root password prompt update

This is an update to the installation script in Chapter 5 on page 21 and Chapter 6 page 31 of the IBM System p AVE Administration Guide.

The installation script no longer prompts you for the root password.

## Uninstalling PowerVM Lx86 update

This is an update to the installation media requirements in Chapter 5 on page 27 of the IBM System p AVE Administration Guide.

**Removal of PowerVM Lx86 and the x86 World**

To uninstall System p AVE:

1. Run the System p AVE uninstall script with the following command:

   ```
   # /installer.pl
   ```

   The script then shows a message similar to the following:

   ```
   Host OS detected as Red Hat Enterprise Linux release 4, Update 4

   Welcome to the PowerVM Lx86 (System p AVE) Installer

   To run Linux/x86 applications the installation will require Linux/x86
   application binaries, libraries and infrastructure files as well as the
   PowerVM Lx86 (System p AVE) software.


   Please refer to the PowerVM Lx86 (System p AVE) Administration Guide and
   Release Notes for further details of the installation requirements.

   License file found

   Registration with IBM

   Existing registration with IBM has been found in /etc/opt/p-ave/activation-detail.
   Would you like to re-register? [y/N] n
   ```

2. If you want to register again, enter `y`. If not, enter `n` or press the Enter key to accept the default `n`. If you choose to skip re-registration, the system displays the following installation menu:

   ```
   Registration with Red Hat Inc.
   Would you like to register? [y/N]
   ```

3. If you want to register again with Red Hat, enter y. If not, enter n or press the Enter key to accept the default n. If you choose to skip the Red Hat re-registration, the system displays the following installation menu:

   ```
   1. Install Software.
   2. Upgrade Software.
   3. Uninstall Software.
   4. Show Installed Products.
   5. Configure Software.
   6. Quit.
   ```

4. Select option **3. Uninstall Software** from the menu.

   The following menu will be displayed:

   ```
   1. Uninstall p-ave + x86 World.
   2. Uninstall p-ave.
   3. Uninstall x86 World.
   4. Go back to the Main Menu.
   ```

```
5. Quit.

Please select the type of operation you would like to perform.
```

5. Select option **1. Uninstall p-ave + x86 World** from the menu.

   The system will prompt you with the following message:

   ```
   Are you sure you want to uninstall p-ave? [Y/n]
   ```

6. Press Enter to accept the default yes, or enter y followed by the Enter key.

   The system then prompts you to remove the log file directory.

   ```
   Remove log file directory (/var/opt/p-ave/log)? [y/N]
   ```

7. Enter y and followed by the Enter key. Note that by default, the log file directory will not be deleted so that any log files contained in the directory will be saved for future reference.

   The system then prompts you to remove the x86 World:

   ```
   Delete x86 World (installed at /i386) from the filesystem?
   You will lose all custom config and installed applications. [y/N]
   ```

8. Enter y to remove the x86 World. All the files stored in the X86WORLD_ROOT will be deleted. Back up any critical data before carrying out this step.

   The system then prompts you to remove the configuration files for PowerVM Lx86:

   ```
   Remove the installation config directory (/etc/opt/p-ave)? [y/N]
   ```

9. Enter y to remove the configuation directory and its contents.

   The system then shows the following:

   ```
   Uninstalling p-ave. Please wait...
   p-ave installation directory (/opt/p-ave) deleted.
   Log file directory (/var/opt/p-ave/log) deleted.
   Uninstalling x86 World. Please wait...
   Config directory (/etc/opt/p-ave) deleted.

   Thank you for using the PowerVM Lx86 (System p AVE) Installer

   Today you performed the following transactions:
    Uninstalled p-ave
    Uninstalled x86 World

   End of Transaction log.

   The full log of your session is in /tmp/p-ave_install_XXXXXX.log
   ```

   The uninstall of PowerVM Lx86 and the x86 World are now complete.

## Reporting a failure

If a Linux x86 application fails while being translated, an error is displayed. In addition, an error log is created in the /var/opt/p-ave/log directory. You can change the location of the default log directory during installation. Log files are created for each running process that encounters an error.

Report the error to IBM Support. Include a description of the failure and what events preceded the failure.

Note: The reported error may be caused by an issue with the Linux x86 application being executed and may not be a problem with PowerVM Lx86.

## Installation process for systems with a previous installation of PowerVM Lx86

If you are installing PowerVM Lx86 onto a machine for the first time, follow the installation instructions in the System p AVE Administration Guide.

For systems with a previous installation of PowerVM Lx86 either upgrade to the new version of PowerVM Lx86 or uninstall PowerVM Lx86 and the x86 World and install the new version of the software.

To upgrade PowerVM Lx86 to the new version, use the following instructions:

1. Run the installer.pl script.
2. Select option **2. Upgrade Software** from the menu.
3. Select option **1. Upgrade a p-ave** installation.
4. Select option **1. p-ave-1.1.1.0** to upgrade from the current version of the software.
5. Select option **6. Quit** from the menu.

To uninstall the previous version of PowerVM Lx86 and the x86 World before installing PowerVM Lx86 release 1.1.1.0, use either the installer provided with PowerVM Lx86 release 1.1.1.0 or the one provided with the previous release.

Uninstalling the x86 World will delete all the files within the x86 World. Linked in files such as the /home directory will not be deleted. You must back up any critical files before uninstalling. You must answer yes when prompted to remove the various directories from the previous installation.

To uninstall a previous version, use the following instructions:

1. Check that all running x86 processes have terminated, then run the installer.pl script.
2. To uninstall the x86 World and PowerVM Lx86, select option **1. Uninstall Software**, and then select option **1. Uninstall p-ave + x86 World**.
3. Answer y to uninstall p-ave.
4. Answer y to remove the log file directory. This is optional. Only remove the directory if you do not require any PowerVM Lx86 log files contained in the directory.
5. Answer y to delete the x86 World.
6. Answer y to remove the installation configuration directory.

The installer script will check if any x86 processes are still running and then shutdown the PowerVM Lx86 daemon (p-ave-daemon) before uninstalling the software.

Now install PowerVM Lx86 release 1.1.1.0 and the x86 World using the installation script provided with the release by running the installer.pl script, selecting **1. Install Software** on the main menu and then **1. Install p-ave + x86 World** and follow the prompts.

## Performance

**General overview**

There are various architectural differences between x86 and Power which can impact performance of translated applications. For example, translating dynamically generated code like Java™ byte codes is an ongoing translation process, which can be expected to impact the performance of x86 Java applications which are using an x86 Java virtual machine. Floating point intensive applications may have some performance penalties. And finally, translating multi-threaded applications can incur an additional performance overhead as the translator works to manage shared memory accesses.

## OS support

This release makes two changes to the supported operating systems:

1. RHEL 4.6 and SLES 9 SP4 are added to the list of supported operating systems.
2. The requirements for which x86 World OS distribution can be supported on a corresponding Power OS have been relaxed. The new requirements state that any x86 World OS distribution can be installed on any corresponding Power OS as long as the x86 World OS minor version is not newer than the Power OS minor version.

The supported OS combinations for this release are:

*Table 2. Table 2. Supported OS combinations*

| Power OS distribution | Supported x86 World OS distribution |
|---|---|
| RHEL 4.4 | RHEL 4.3<br>RHEL 4.4 |
| RHEL 4.5 | RHEL 4.3<br>RHEL 4.4<br>RHEL 4.5 |
| RHEL 4.6 | RHEL 4.3<br>RHEL 4.4<br>RHEL 4.5<br>RHEL 4.6 |
| SLES 9 SP3 | SLES 9 SP3 |
| SLES 9 SP4 | SLES 9 SP3<br>SLES 9 SP4 |
| SLES 10 | SLES 10 |
| SLES 10 SP1 | SLES 10<br>SLES 10 SP1 |

Note: Only x86 RHEL 4 Application Server (AS) is supported by the installer. RHEL 4.3 on Power is not supported by PowerVM Lx86. RHEL 4.3 is supported as an x86 World environment on RHEL 4.x for Power. RHEL 5 is not supported in this release.

For SLES 10.1 the minimal package set is equivalent to a 'Server Base + Novell AppArmor' installation using YaST2 and the full package set is equivalent to

selecting all packages using YaST2, except the agfa-fonts package. This package can be installed separately after installing PowerVM Lx86 and will require the user to agree to the license terms.

For RHEL 4.x the minimal package set is equivalent to a 'minimal' installation using anaconda and the full package set is equivalent to selecting all packages using anaconda.

Note: The RHEL 4.x minimal package set does not include system-config-packages, the default package management tool for RHEL. The Administration Guide contains details of how to manage packages on RHEL.

## Java support

Support is provided for Sun Java SE 6.0 (version 1.6), Java SE 5.0 (version 1.5), 1.4 and 1.3. Support is also provided for IBM Java 1.5, 1.4, and 1.3.

Note: IBM Java 1.6 is not currently supported.

## Globalized error messages and installation text

**Product renaming to PowerVM Lx86**

The installer has been updated to include the new PowerVM Lx86 naming convention, but this change has only been made to the US English installation text. Installing on a non-English system will use the System p Application Virtual Environment and System p AVE naming convention as used in the 1.1.0.0 release.

Error messages in the 1.1.1.0 use the System p AVE, p AVE and p-ave naming conventions used in the 1.1.0.0 release.

## Viewing the installation log files - logviewer

A script called logviewer is provided to allow the PowerVM Lx86 installation log files to be viewed in terminals with non-English locales.

The installation log file is stored in the UTF-8 encoding to support different locales. Although the log file contains the complete character information, it cannot be viewed in a terminal until it has been transcoded into the encoding specified by the current locale.

**Description**

logviewer reads a p-ave log file (stored in the UTF-8 encoding) and transcodes it to the encoding specified in the current locale. Logviewer behaves in a similar way to cat, taking files on stdin or as arguments and returning them to stdout. If you invoke logviewer without any arguments it will wait for input from stdin. You may specify the option —more or —less to have the output piped to the more or less command line programs respectively.

**Location**

<PowerVM Lx86 install location>/installer/resources/bin/RO/logviewer

**Usage**

logviewer [—help]

logviewer /tmp/p-ave_install_XXXXXX.log

logviewer [—more|—less] /tmp/p-ave_install_XXXXXX.log

## General application issues

If a hang or failures occurs with an application, report issues to IBM Support.

*Table 3. Issues with specific applications*

| Application | Problem |
|---|---|
| VolanoMark | Occasional hangs are observed with a range of JVMs. |

## Other known issues

## Access times on directories

As part of the operation of PowerVM Lx86, access times of directories may be updated more regularly than normally expected by a running x86 application due to the 'jailing' mechanism. This is not expected to have an impact on any applications.

## Argument lengths

The PowerVM Lx86 'jailing' mechanism adds the X86WORLD_ROOT (e.g. /i386) characters to some system call arguments. This reduces the maximum length of arguments that can be made by a translated x86 application.

## UTF-8 console

If the installer is run from a console that doesn't support UTF-8, some characters might be shown incorrectly.

## Configuration file comments

The configuration file (/etc/opt/p-ave/config) does not support # style comments or leading spaces. Only configuration switches can be entered in the file, one at the start of each line.

## Limitations with escapes

It is not possible to move an existing escape directory or file from within the x86 World, for example by using the mv command. To move an escape, delete the escape (by deleting the symlink file in the x86 World from a Power shell), move the underlying Power file or directory, and then use linkx86 to create a new escape to the file or directory.

## gdb support

This release has support for the x86 command line debugging tool gdb in addition to strace, ltrace and coredump support.

It is possible to debug an x86 application from within a translated x86 gdb session. It is also possible to attach a translated x86 gdb to a running x86 process.

Note: Hardware watchpoints are not supported by PowerVM Lx86. When running gdb under translation you may see the following message: "Couldn't write debug register: Input/output error." This message is not fatal and is expected behaviour for the translator.

**gdb support on RHEL 4.3**

The version of gdb included in the RHEL 4.3 x86 World will fail to run a multi-threaded application. This can be worked around by updating the gdb rpm to gdb-6.3.0.0-1.132.EL4.i386 or later.

## coredump support

Core dumps of simple applications (single threaded applications and those that do not register signal handlers) may produce inaccurate core files. Set the EXTRA_DEBUG_SUPPORT_FROM_START switch to y in the configuration file or as an environment variable and retry the application to generate an accurate core file. This is not required for the majority of applications. See the examples below:

From within the /etc/opt/p-ave/config file:

```
EXTRA_DEBUG_SUPPORT_FROM_START=y
```

From the environment, set the following variable:

```
P_AVE_CFG_EXTRA_DEBUG_SUPPORT_FROM_START=y
```

## User management

Only the /etc/passwd file and NIS are supported name space registries for user management with this release. All others, including LDAP, are unsupported at this time.

## Stopped and zombie processes

If a translated x86 process is stopped, the process will not appear in the x86 /proc entries. The process is still running on the system and will be visible from a POWER™ shell, but will not be visible to x86 tools such as ps and top. If the process is continued, it will reappear in the x86 /proc entries and will be visible to the x86 ps and top commands again.

## Local X11 display on RHEL 4 and SLES 9

Graphical applications may not work when running on the local X11 display or using VNC due to an error in the X server and VNC Server. Running on the local X display may also require the command xhost + to be run from within a POWER bash shell before running the translated applications. Also, ensure that the display is set to a defined network name, for example, DISPLAY=localhost:0.0, not DISPLAY=:0.0. If you want to use a local display and connect directly to the local X server (rather than via TCP), an escape can be created for the .X11-unix socket directory. Use linkx86 to create the socket from a POWER shell by typing the following command:

```
linkx86 /tmp/.X11-unix
```

## Colors in X11 applications

Some graphical applications, such as Adobe Macromedia Flash, may display colors incorrectly when run under translation if displayed on a local POWER X server.

## Root user and root password

In a translated x86 shell, if the user is running as root, then the user has the same privileges as root in the POWER environment.

This is an expected behavior of the x86 environment.

If an escape is created from the x86 World to the POWER filesystem (which can only be carried out by the POWER root user), then a root user in the x86 environment can access POWER file system as the root user.

The user id support within PowerVM Lx86 defaults to using the Power password for the root user in the x86 World. Only if PowerVM Lx86 is explicitly setup to use separate passwords for the x86 World and Power system will the user be prompted for a root password for the x86 World.

## Mount support

**Using mount from an x86 shell or application**

If a directory or device is mounted from within a translated shell, then the directory must only be unmounted from within a translated shell.

Unmounting the directory in a POWER shell will cause the unmount to occur, but the device may still appear to be mounted. This must be explicitly cleared.

**Using mount from a POWER shell**

If a directory or device is mounted from a POWER shell, then the directory must only be unmounted from a POWER shell.

**Using NFS mounts within a translated shell or application**

Mounting NFS folders from an x86 shell is not supported. Mount the NFS folders from a POWER shell to a mount point that is visible to the x86 World.

## System resource conflicts

Certain system resources are shared between PowerVM Lx86 and the Power environment. By default, PowerVM Lx86 and the Power environment use the same IP address. Attempts to bind to a certain port by a translated application will fail if that port is already used by a Power application.

For example, if a Power version of apache (httpd) is using port 80, an x86 instance of apache (httpd) will be unable to use that port. This can be resolved by running one of the apache instances on a different port number.

## Disk performance

Disk performance may be slower on disks formatted using reiserfs than with ext2 or ext3. ext3 should be used as the default disk format for PowerVM Lx86.

## Out of memory

If an x86 application uses up all of the available memory, PowerVM Lx86 may exit with an error.

## Accuracy of floating-point instructions

Due to the precision differences in floating point hardware implementations between the x86 and native Power systems, the precise results of floating point instructions may not be the same as running the application natively on x86 hardware.

## Notices

IBM PowerVM Lx86 for x86 Linux applications 1.1.1.0

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The following are Excluded Components: SoftFloat release 2b queue.h glibc-headers-2.3.4-2.19

**Softfloat**

This C source fragment is part of the SoftFloat IEC/IEEE Floating-point Arithmetic Package, Release 2b.

Written by John R. Hauser. This work was made possible in part by the International Computer Science Institute, located at Suite 600, 1947 Center Street, Berkeley, California 94704. Funding was partially provided by the National Science Foundation under grant MIP-9311980. The original version of this code was written as part of a project to build a fixed-point vector processor in collaboration with the University of California at Berkeley, overseen by Profs. Nelson Morgan and John

Wawrzynek. More information is available through the Web page `http://www.cs.berkeley.edu/~jhauser/ arithmetic/SoftFloat.html'.

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**queue.h**

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@(#)queue.h 8.3 (Berkeley) 12/13/93

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