Pleora Technologies

eBUS–Pure GEV

Linux Software

Guide

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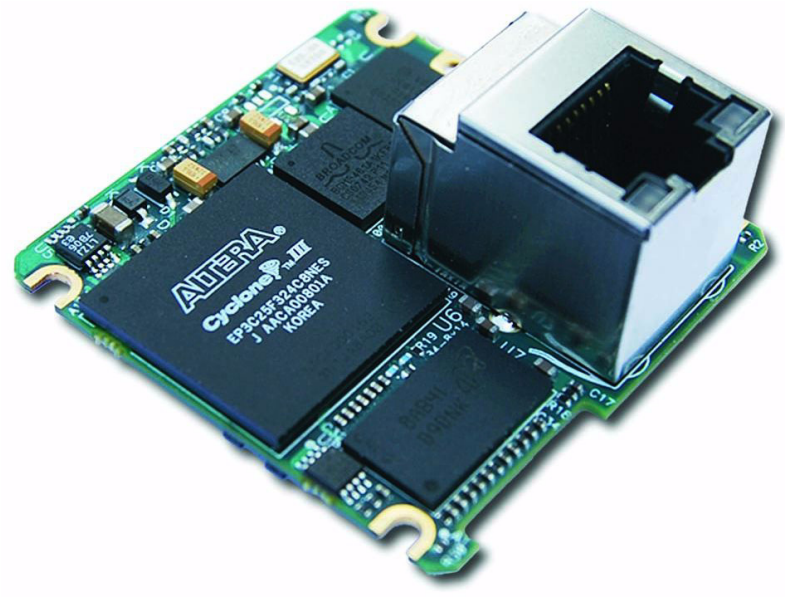

...Cost-effective video transport

Release 1.0, 12/18/09

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Installing eBUS-PureGEV for Linux

Introduction

This guide provides instructions for installing the Pleora eBUS Drivers Suite and the iPORT PureGEV suite for the Linux operating System. In addition, this guide explains how to optimize the Intel Pro/1000 series driver to enhance its performance with Linux.

Requirements for the RHEL 5.X

The RedHat Enterprise Linux (RHEL) 5.X fontconfig version is not compatible with Qt 4.5.

Therefore, you must update fontconfig to the latest version available at:

http://fontconfig.org/release/fontconfig-2.4.2.tar.gz

NOTE! You must disable the network firewall prior to the installation of eBUS-PureGEV for the Linux operating system, or the application will not detect the device (camera).

Scope

This guide is intended for these technical personnel:

- Experienced Linux developers and system administrators
- Installation Engineers and System Integrators
- Technical Support/Application Engineers (Linux)

Resource References

The eBUS-PureGEV Linux Software Guide is complemented by the resource references and website links listed below.

The publications and Web sites listed below are current at the time of publishing this guide.

Linux Operating System

More information about the Linux Operating System can be found at:

1. Linux:
   - http://www.linux.org/
2. SELinux
   - http://en.wikipedia.org/wiki/Security-Enhanced_Linux

eBUS-PureGEV Suite

More information about the eBUS-PureGEV Suite can be found at:

1. Pleora Website:
   - http://www.pleora.com/products/ebus_puregev.php

Minimum System Configuration

Pleora recommends this minimum system configuration for installing the eBUS-PureGEV Linux package:

- Redhat Enterprise Linux O/S RHEL 5.4
- Intel Pentium 4, 2 GHz with 1 GB RAM

Installing the eBUS-PureGEV Linux Package

Install the e-BUS PureGEV Linux package using the recommended system confguration and installation procedure.

To install the eBUS-PureGEV for Linux:

1. Locate the installer on the Installation CD and copy it to your Home directory.

The eBUS-PureGEV package contains 2 files:

Linux_Software_Guide.pdf;

puregev_<version>_<linux distro & version>.run (e.g., puregev_2.0.0.1462-redhat_el-5.4.run);

The zip file contains the .run file.

2. Log in as root in the Linux Command Shell.

```
[user@computer ~]$ su -
Password: ******
```

3. Run the Installer.

Run the .run file:

```
[root@machine ~]# ./puregev_2.0.0.1462_redhat-el-5.4.run
Verifying archive integrity... All good.
Uncompressing eBUS-PureGEV 2.0.0 for
Unix.....................................
.......................................................................
...........
.......................................................................
...............................................
```

```
eBUS-PureGEV 2.0.0 for Linux
  (redhat-el-5.4)
========================================

Installing software on /usr/local/puregev
Installing library symbolic links in /usr/lib
Installation complete.
```

The eBUS-PureGEV for Linux is installed on /usr/local/puregev.

About SELinux

Security-Enhanced Linux (SELinux) is a Linux feature that provides a mechanism for supporting access control security policies and standard mandatory access controls, through the use of Linux Security Modules (LSM) in the Linux kernel. This version of Linux is not a Linux distribution, but a set of modifications that can be applied to this operating system. The specific architecture of SELinux streamlines the volume of software charged with security policy enforcement.

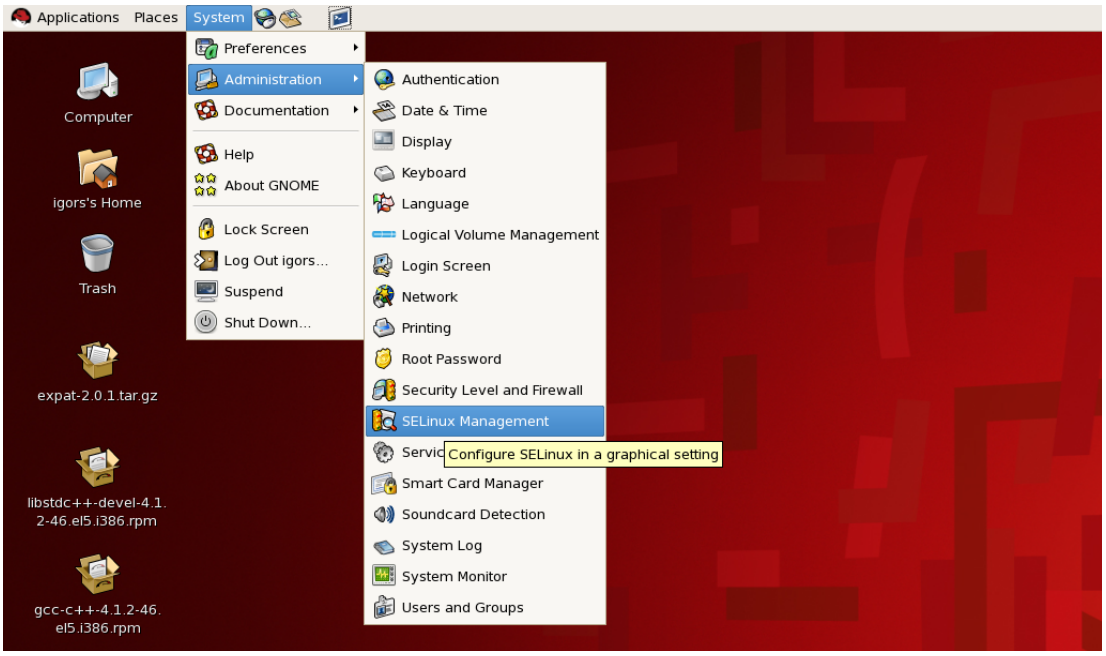
SELinux Run Permissions

Due to the current operating parameters of the eBUS-PureGEV package for the Linux O/S, you must modify the run permissions of your Linux System, if you have enabled Security Enhanced Linux (SELinux).

In the Redhat Enterprise Linux environment, you must disable the security settings for Security Enhanced Linux (SELinux):

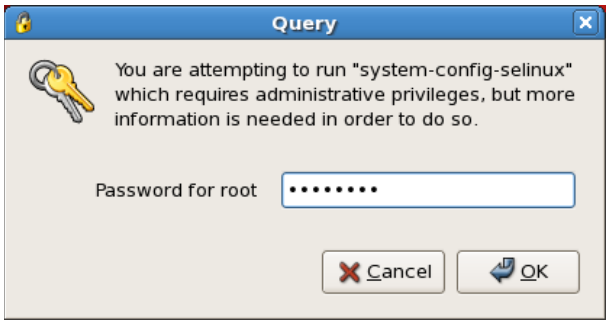
1. To permanently disable this feature, change the settings of the SELinux Managment utility:

In the **Menu Bar**, click **System> Administration>SELinux Management**

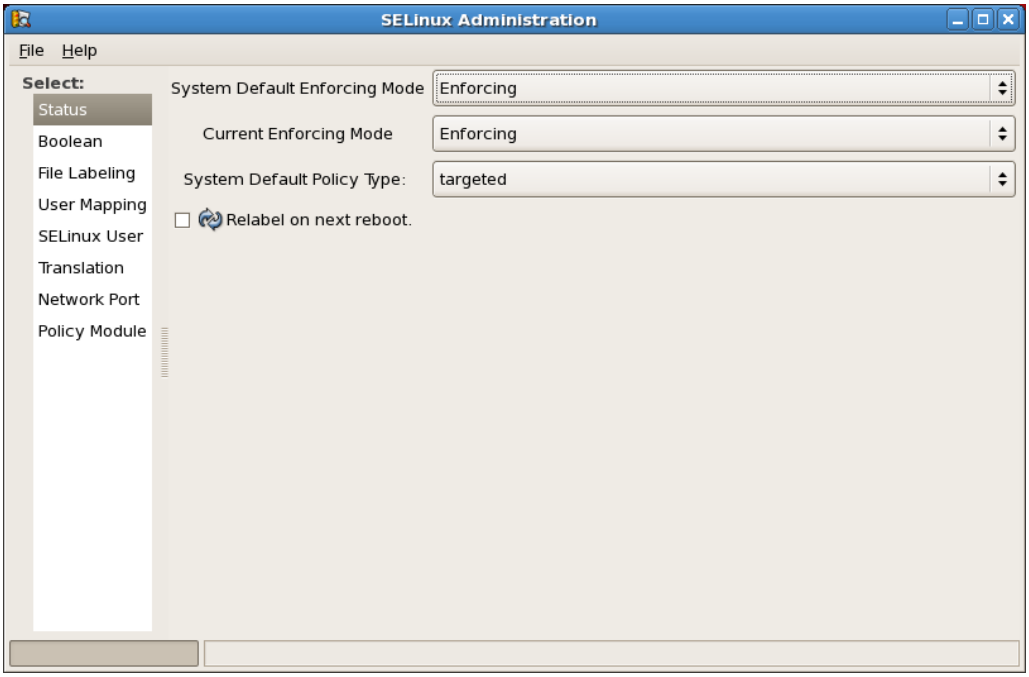


The SELinux Management Utility Window appears.

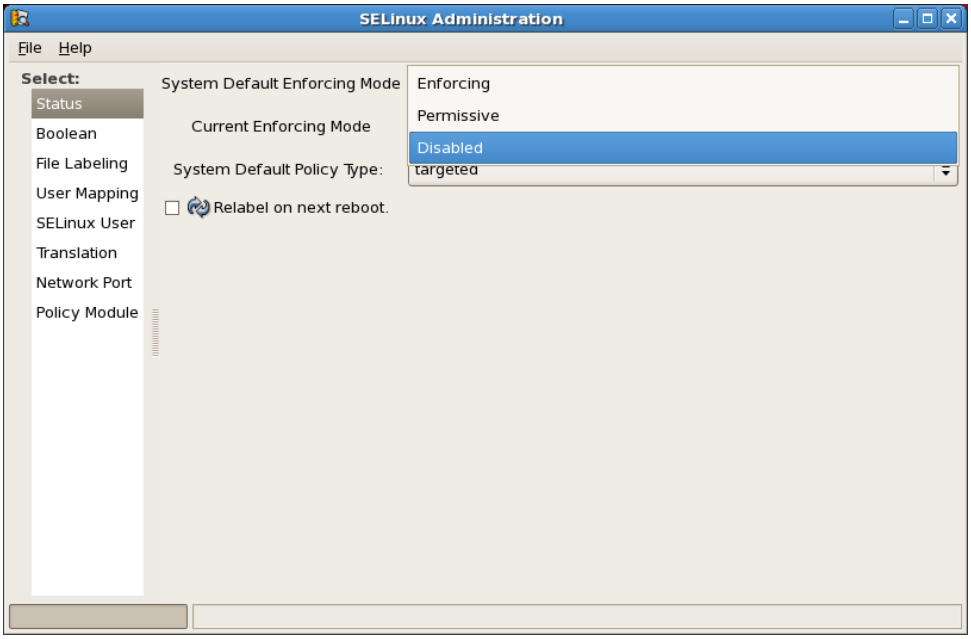
2. Enter the root password.



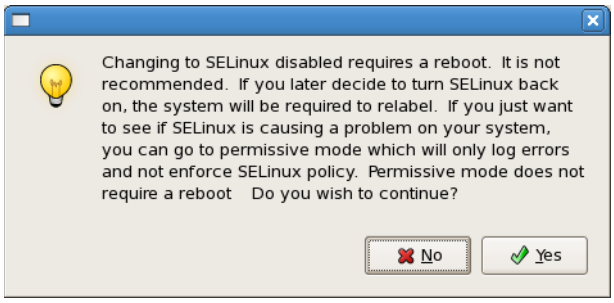
3. Click **OK**.
4. Disable the security Mode



5. Select **Status>System Default Enforcing Mode=Disabled** (pull-down)



The SELinux Disabled Re-boot message appears



6. Click **Yes** to verify the changes.
7. Reboot the system with SELinux, disabled.

Enhancing the Intel® Pro/1000 Driver

The Intel® Pro/1000 Driver is a generic driver for all Intel PRO-1000 (GigaBit) network cards and 8254x-based PCI Ethernet Adapters and Chipset-integrated NICs.

Configuring Network Interfaces

It is important for you to configure your particular Linux network interface for maximum performance with the eBUS-PureGEV Linux package; each Linux network interface is different.

You can configure your network interface from the command line.

1. Change the IP address of the network interface:

```
# ifconfig eth<#> down
# ifconfig eth<#> inet <ip-address>
# ifconfig eth<#> up
```

2. Change the Maximum Transmission Unit (MTU), or packet size, of a network interface

```
# ifconfig eth<#> mtu <packet size>
# ifconfig eth<#> up
```

You can combine a number of these commands in one line. For example, to set eth1 to 192.168.4.100, with an MTU of 8164 bytes:

```
# ifconfig eth1 inet 192.168.4.100 mtu 8164 up
```

Modifying the Pro/1000 Driver

NOTE! This procedure applies to the Intel® Pro/1000 Driver, only.

It is highly recommended to optimize the number of CPU cycles consumed by the network adapter driver during video streaming. You can enhance the performance of the Intel® Pro/1000 driver by modifying some of the driver configurations.

To modify the Intel® Pro/1000 Driver:

1. Open a terminal as a root user.
2. Unload the Intel kernel module (Pro/1000 driver):

```
[root@machine ~]# /sbin/rmmod e1000
```

NOTE! You must have the Intel® Pro/1000 Driver installed on your PC. The Intel Pro/1000 kernel module is available as either the e1000 or e1000e variant. The e1000e designation is for PCI Express Network interface adapters.

3. Re-configure the Pro/1000 kernel module.

After you have unloaded the driver, you must re-configure the driver with the correct configuration for the eBUS-PureGEV package for Linux. Each of the Intel® Pro/1000 type Network Card Adapters serviced by the e1000/e1000e kernel modules has its own set of parameters. If you have more than one adapter, you must use this convention:

```
moduleparameter=ValueForAdapter1,ValueForAdapter2,ValueForAdapterN
```

The driver parameters that you need to modify in the Pro/1000 driver are listed in the table below:

Pro/1000 Driver Parameters

Parameter Name	Required Value
`InterruptThrottleRate`	1000
`RxIntDelay`	1024
`RxDescriptors`	4096

The required values for the Pro/1000 parameter names in the above table are optimal for streaming large amounts of data to the PC. Normally, the default driver configuration is ideal for applications in generic networks, without a high data rate.

4. For a single Pro/1000 Network adapter, you must load either of the e1000/e1000e kernel type modules with this command:

NOTE! If you are using multiple Pro/1000 adapters, skip this step and proceed to Step 5.

```
[root@machine ~]# /sbin/modprobe e1000 InterruptThrottleRate=1000 \
                RxIntDelay=1024 RxDescriptors=4096
```

5. You can employ multiple Pro/1000 adapters into one PC. For example, for 3 Intel® Pro/1000 network adapters, the configuration command set is stated below:

```
[root@machine ~]# /sbin/modprobe e1000
                InterruptThrottleRate=1000,1000,1000 \
                RxIntDelay=1024,1024,1024            \
                RxDescriptors=4096,4096,4096
```

6. Then you must restart each network adapter; to restart a network adapter:

```
[root@machine ~]# /sbin/ifconfig eth<#> up
```

where, <#> is the index of the specific network adapter.

NOTE! The configuration changes noted above are not permanent; these parameters are reset by the operating system the next time you reboot, or the next time you unload the kernel module. If you want to set them permanently, you must modify the configuration files of your operating system. To ensure all these changes are automatically applied each time the computer is restarted, consult the documentation of your Linux distribution.

GEVPlayer and the PureGEV SDK

GEVPlayer is a powerful and versatile image capturing application that allows you to configure your iPORT IP Engine and begin capturing images with your PC.

The PureGEV SDK is a rugged software development kit that contains feature-rich C++ classes and development methods that allow you to efficiently transfer the images from your camera to your PC.

Increasing the Size of the Socket Buffers

You must increase the size of the socket buffers on your system PC, from less than a few Kilobytes (KB) to 10 MB, prior to running the eBUS-PureGEV Linux Package so that you can stream large amounts of video data:

```
[root@machine ~]# /usr/local/puregev/bin/set_socket_buffer_size.sh
```

NOTE! This script sets some temporary runtime parameters; these parameters revert to the default values at the next system reboot. These parameters are reset by the operating system the next time you reboot, or the next time you unload the kernel module. If you want to set them permanently, you must modify the configuration files of your operating system. To ensure all these changes are automatically applied each time the computer is restarted, consult the documentation of your Linux distribution.

Running the PureGEV GEVPlayer

You can run the GEVPlayer application from the Linux Command Shell.

To run the GEVPlayer application:

```
[user@computer ~]$ /usr/local/puregev/bin/GEVPlayer
```

Using the PureGEV SDK

Set up the PureGEV SDK environment from the command line.

1. Source the script below:

```
[user@computer ~]$ source /usr/local/puregev/bin/set_puregev_env
```

NOTE! You do not need to run the script above to run GEVPlayer. Run this script when implementing proprietary programs with the PureGEV SDK, or when running sample programs.

This step sets the necessary environment variables listed in the table below

PureGEV Environment Variables

Variable	Description
PUREGEV_ROOT	Location of the PureGEV files
GENICAM_ROOT	Location of the GenICam files
GENICAM_ROOT_V2_0	Location of the GenICam v2.0 files
QT_LIB_DIR	Location of the QT Libs used by the PureGEV PvGUI
LD_LIBRARY_PATH	Search path for library dependencies.
PATH	Search path to locate applications

2. Compile and run your code.

Uninstalling eBUS-PureGEV for Linux

You can uninstall the eBUS-PureGEV Linux package from the Linux Command Shell.

Uninstall Procedure

To uninstall the eBUS-PureGEV Linux package:

1. Log in as root in the Linux Command Shell.
2. Run the uninstaller:

```
[root@machine ~]# /usr/local/puregev/bin/uninstall.sh
```

3. Confirm your intent to perform the uninstall at the prompt (Yes/No):

```
eBUS-PureGEV 2.0.0 for Linux
  (redhat-el-5-4)
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Remove eBUS-PureGEV installed in directory '/usr/local/puregev'
(yes/no) ? yes
Removing software on /usr/local/puregev
Removal complete.
```

Notes