



## An Overview of Red Hat Developer Suite

### **Abstract**

This white paper provides information on Red Hat Developer Suite, a member of the *Red Hat Applications* product family. It describes the goals of Red Hat Developer Suite, the Eclipse IDE on which Red Hat Developer Suite is based, as well as Red Hat's value-added features and plug-ins and briefly outlines some of the work that is currently underway that will be available in the near future.

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## Introduction

Red Hat Developer Suite is a member of the *Red Hat Applications* product family. It provides a full-featured Integrated development Environment (IDE) for application developers based on the open source *Eclipse* project (<http://eclipse.org>).

Red Hat Developer Suite is available as an optional Red Hat Network download for all Red Hat Enterprise Linux subscribers. The goal of Red Hat Developer Suite is to encourage widespread adoption and to simplify Enterprise Linux application development.

Red Hat Developer Suite includes support at the level inherited from the underlying Enterprise Linux product subscription and is currently available on x86-compatible systems only. 64-bit functionality and support is currently being developed and will be available in the near future.

## Overview

Eclipse provides an environment for developers to efficiently create a wide variety of applications in a rapidly growing set of languages. Eclipse supports a wide range of operating systems beyond Red Hat Enterprise Linux, including Windows (XP, 2000, 98, ME) and Solaris 8. This simplifies the migration of applications and developer skills from these platforms to Red Hat Enterprise Linux.

Red Hat Developer Suite includes:

- Eclipse 2.1 framework
- Java Development Tools (JDT) plugin
- C/C++ Development Tools (CDT) plugin
- Plugin Development Environment (PDE)
- RPM/SRPM Plugin
- Profiling Plugin
- Enhanced Documentation

## What Sets Red Hat Developer Suite Apart?

With Red Hat Developer suite, you get more than the stock Eclipse. Additional value added features and components include:

- Native compilation
- A new RPM/SRPM plugin
- A new profiling plugin
- Improved standard documentation focusing on Linux with Linux-based visuals
- Additional documentation
- Supported by Red Hat; Certified on Red Hat Enterprise Linux
- New plugins and features as they become available (see below)

### Native Compilation

Red Hat Developer Suite features a natively compiled version of Eclipse, compiled using GCJ, the GNU ahead-of-time compiler for the Java programming language (see <http://gcc.gnu.org/java/>). This reduces or removes the need for a 3<sup>rd</sup> party JVM<sup>1</sup> and provides improvements in start-up time and overall performance. Native compilation of Eclipse was made possible by Red Hat's GCJ innovations and Eclipse enhancements. Even though the default behavior is to run natively compiled, a 3<sup>rd</sup> party JVM can still be used instead by specifying a simple command line option at start up time if so desired.

### RPM Plugin

Red Hat has developed a new Eclipse plugin for Red Hat Developer Suite that enables developers to easily manage Linux RPM formatted software packages. The purpose of the RPM plugin is to allow developers to easily import source rpm's and re-export them as source and/or binary RPM's and to allow developers to export existing Eclipse C/C++ projects to binary/source RPM format.

For those developers unfamiliar with the RPM package format, the process of creating the files necessary to generate a properly formatted “.rpm” file that can be successfully installed on a Linux system can be challenging. Red Hat's RPM plugin is designed to provide the developer with an automated method of creating RPM packages from simple C/C++ projects that are ready to install on

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<sup>1</sup> Currently recommended for C/C++ development only. A JVM is required for debugging Java applications within Eclipse.

any Linux system and to allow developers to import previously-created source RPM's, modify them and re-export them in both binary and source format with minimal effort.

Features of the RPM plugin include:

- Ability to import source RPM's, modify them then re-export them as source or binary RPM's. The RPM plugin will modify the previous spec file in the following ways with information supplied by the developer via the GUI:
  - update version and/or release numbers
  - add Patch/%patch statements in the appropriate places
  - add "%changelog" comments formatted correctly
- Ability to export C/C++ projects to binary/source RPM format that have not previously existed in RPM format. The developer has the following options:
  - allow the RPM plugin to create a "bare bones" spec file
  - allow the developer to provide a spec file

Some of the future enhancements planned for the RPM plugin are:

- Allow the developer to specify whether or not to apply patches when imported
- Enhancements to the spec file editor
- Improved spec file generator
- Export binary/srpm as a "Test" only (ie. nothing is actually produced)

## Profiling Plugin

Red Hat has developed a set of Eclipse plugins for Red Hat Developer Suite that provide the developer with tools for performance profiling utilizing the open source OProfile project, integrating control, configuration, and analysis into the Eclipse workbench.

OProfile is a powerful, low-overhead system profiler that leverages processor hardware performance counters to enable system-wide profiling of a wide variety of events, including the number of clock cycles that the processor is halted, the number of instruction fetch misses, the number of L2 data loads or stores, and much more. Capable of profiling any application or shared library without recompilation, it runs on a variety of hardware platforms.

Red Hat's profiling plugins for Eclipse consist of two main functional areas: configuration and launch of the OProfile daemon, and analysis of the collected data. These tasks are accomplished within the Eclipse workbench via common Eclipse workflows. Experienced Eclipse users should have little trouble using the OProfile plugins.

The Eclipse launch manager controls the "launching" of Java applets and

applications, C and C++ applications, and JUnit tests. With the OProfile plug-ins installed, it also controls the configuration and launch of OProfile. Developers can specify a wide range of options to control the behavior of OProfile, such as whether to profile the kernel or the OProfile daemon and what event to collect in each of the counters available on the system. Click on the Run button, and OProfile will start collecting the requested data.

When data collection is complete (or even while it is still running), data analysis can begin. Developers use the Profiling perspective and its views to navigate and view the collected data. Instead of browsing projects in the Project Navigator, developers browse OProfile *sessions* (collections of “samples”) in the System Profiling View. Instead of browsing source files, developers browse applications and shared libraries for which OProfile has collected data. The System Profiling View is tightly integrated with the Sample View. Selecting an item in the System Profiling View will cause the Sample View to display collection statistics for that item.

Select the whole session, and the Sample View displays overall system collection statistics: the applications and shared libraries in which the system collected the most samples. Select an application or shared library, and the Sample View displays in which functions in the application or shared library the most samples were collected. Select a function, and the View displays which source lines had the most samples. The developer can then display the exact location in the source file where the sample was collected.

## Coming Soon: Hover Help Plugin

Red Hat is currently working on an Eclipse plugin that will provide the developer with API Checking capability. The API checking capability – otherwise referred to as CDT Hover capability – provides a mechanism that displays a short description of the significance of a “known” string when the pointer is placed over it. The typical application of this is when the text string identified corresponds to the name of a C library function.

For example, if the pointer is placed over the libc function named “strlen” in the following (non-functional) code sample:

```
#include <stdio.h>
main()
{
    GdkDrawable* re = gdk_drawable_ref();
    GtkWidget * hs = gtk_hscrollbar_new();
    int kk = strlen("jjjj");
    fprintf(stderr, "stuff\n");
    qsort();
}
```

the following information will be displayed:

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```
#include <string.h>
```

```
size_t strlen(const char *s)
```

The `strlen` function returns the length of the null-terminated string `s` in bytes. (In other words, it returns the offset of the terminating null.)

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Similarly, positioning the pointer over the other example functions (`gdk_drawable_ref()`, etc.) will provide a short description of those functions.

This capability relies on the presence of one or more Java "property" files containing information pertaining to the various library functions. At the present time, such property files exist for the standard C `glibc` library, the `GTK+` (including `GDK` and `GDK-pixbuf`), and `X11` (including `Xlib`, `Xt`, `Xaw`, `Xmu`, and others) libraries. Other libraries may be easily added as they are identified as being useful.

## Also Coming Soon

- Eclipse Framework 2.1.1 and CDT 1.2 upgrades
- Support for 64-bit hardware (both Intel's and AMD's)
- Integration with other members of the *Red Hat Applications* product family

## Summary

Red Hat Developer Suite is a member of the *Red Hat Applications* product family. It provides a full-featured Integrated development Environment (IDE) for application developers based on the open source *Eclipse* project and includes value-added features and plug-ins aimed at improving the developer experience and easing the migration of both applications and development skills from other platforms to Red Hat Enterprise Linux.