



Software debugging & effective bug reporting

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Bug reporting,

- How to report an annoying feature and/or requesting a new feature in an application.
 - BE NICE!
 - Talking to the developer and/or explaining why this feature is annoying or why this missing feature is important is a big plus "When I explained why the libwxgtk should be compiled with unicode/gtk2 support is important for Arabic language, The package maintainer got interested".

Debugging

- What is debugging, What's a debugger ?
- The GNU debugger "gdb"
- Compiling applications with debugging symbols.
 - ggdb
- Removing the debugging symbols "strip -S"
- Obtaining a meaningful back trace.
 - What's a back trace ?
A list of steps by the application or a list of function calls lead to this situation.
 - What is a core file ? What's a core dump ?
Simply the memory of the application is being dumped to a file!
 - Getting a useful back trace:
 - we must compile with debugging symbols
 - ggdb
 - from a core file
 - gdb <application> <core file>
 - where
 - Attaching to another process
 - gdb <application> <pid>
 - where
 - This is useful if the application is started via a script as openoffice and mozilla.**
 - Directly from gdb
 - gdb foo
 - [set args bar zot]
 - r
 - When the crash happens: go back to the terminal, You might need to press C-C**

where
quit

- How to set break points.
break file.c:##

Diff and patches

- How to generate a unified diff:
diff -Naur <orig> <modified>
-N - Treat absent files as empty.
-a - treat all files as text
-u - Unified diff:
-r - recursive
- How to exclude:
-X <file>
- How to apply a patch:
patch [--dry-run] [-p#] < patch
--dry-run: Don't really modify files.
-p#: strip # leading slashes from the files.
- How to remove "unapply" a patch:
patch -R
-R: Reverse.

CVS:

- Using my CVS server as an example.
- How to login.
cvs -d:pserver:anonymous@uniball.dyndns.org:/var/lib/cvs login
export
CVSROOT=":pserver:anonymous@uniball.dyndns.org:/var/lib/cvs"
cvs login
- How to checkout.
cvs -d:pserver:anonymous@uniball.dyndns.org:/var/lib/cvs co
projects/illegal
or
export
CVSROOT=":pserver:anonymous@uniball.dyndns.org:/var/lib/cvs"
cvs -z3 co projects/illegal
- How to update.
cvs -z3 update
- How to request a diff
cvs diff -u or cvs diff -u <file>

Demonstration of some crashes using my "illegal operation" application

- 1: Integer by zero (Random value) - Our code crashed.
- 6: strcpy crash! (Copy to a NULL pointer) - here our application caused an external function to crash.

Bugzilla:

- Bugzilla is one of the most widely spreaded bug tracking systems.
- Registration:
- Submitting a bug:
 - Gnome bugzilla: <bugzilla.gnome.org>
 - Mozilla bugzilla: <bugzilla.mozilla.org>
 - KDE bug tracking system: <bugs.kde.org>
 - OpenOffice IssueZilla.
- We might have a wizard.
- We might have the old complicated method.
- Severety "If found": The effect of the bug on the user.
 - Blocker: Non usable application.
 - Critical: Crashes, causes loss of data, or is a severe memory leak.
 - Major: Major loss of functionality
- Priority "If found": The importance of the bug
 - Immediate: Can't test or use the application or it's a security issue.
 - Urgent: I can't use an important features of the application because of it.
 - High: Something is broken but the application is still usable.
- We have more bug tracking systems like gnats and the debian bug tracking system.

strace & ltrace: trace system calls, signals & library calls

Notes about interacting with the developers:

- Generally be nice and remember that the guy is a volunteer.
- Generally don't hijack a thread to include your patch, The patch is a trivial thing, This means that you attach it to the same thread if related, Otherwise start a new thread.
- Most people prefere the unified diff format.
- Try to stick to the coding standard used by the developer, This is not that important unless you are emailing a kernel patch ;-)
- Don't feel angry if the developer tell you that the software is under the GPL and you can do whatever you can.
- When reporting a bug, Report either a reproducible bug or the exact steps you followed with a backtrace if you can't reproduce it.

Links:

- Capturing Stack Traces <<http://bugzilla.gnome.org/getting-traces.cgi>>
- The GNU debugger:
- Emacs!: <www.emacswiki.org> ;-)
- GDB, The GNU Debugger: <<http://www.gnu.org/software/gdb/gdb.html>>
- Unified diff format and example:
<http://www.gnu.org/software/diffutils/manual/html_node/Detailed-Unified.html>