



DBX FEATURES

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What is dbx

dbx is a popular, Unix-based source-level debugger found primarily on Solaris, AIX, IRIX, and BSD Unix systems.

(wikipedia.org)

- It has been originally developed by M. Linton at University in Berkeley in 1981
- Sun provides dbx as a part of Sun Studio suit.
- Supported languages: C, C++, Java, Fortran
- Supported compilers: Sun Studio compilers, gcc, g++
- Supported platforms: Solaris, Linux

Displaying Data

General syntax for printing an expression

```
(dbx) print [-format] expr
```

where *expr* is c-like expression and *format* is printf like format

examples:

```
(dbx) print buf[2]
```

```
(dbx) print -f"text is: %s" buf+strlen(p->text)+1
```

Setting output base for printing integer constants

```
(dbx) dbxenv output_base 16 # all output in hex
```

Examining memory contents

Examples

```
(dbx) examine main+0x1c/5i  
(dbx) x &(((pRec)0x8046e3c)->buf[2])/20x  
(dbx) help examine
```

Format characters

n	1 byte decimal	x	2 bytes hex
d	2 bytes decimal	X	4 bytes hex
D	4 bytes decimal	Lx or LX	8 bytes hex
c	character	i	instruction
s	string (ZT)	f, F	4 resp. 8 bytes float

Stepping Through a Program

```
(dbx) next [n]      # step n lines (over functions)
(dbx) step [n]      # step n lines (into functions)
(dbx) step up       # finish a function
(dbx) step to func # step to function func
                   # useful when there are multiple
                   # functions on one line

(dbx) cont          # continue execution
(dbx) cont at n   # continue execution from line n
```

Ctrl-C can be used to interrupt a running process and to fall to a debugger

Event Management

General event specification

```
(dbx) when event_specification { side_effect_actions }
```

Breakpoints

```
(dbx) when in main { stop; whereami; }  
(dbx) stop in main # equivalent to the one above  
(dbx) stop at file.c:21  
(dbx) stopi at main+0x40  
(dbx) when at file.c:41 -if errno == 4 {  
    > when in foo -temp { print buf[3]; }; }
```

Memory Access/Change Events

```
(dbx) when access r &buf[3] { where; examine buf/s; }  
(dbx) stop access wb 0xffbffa34, 4
```

Event Management, cont.

List of event types:

- breakpoint
- tracing
- data access and change events
- thread create, thread exit
- signal
- system call (in/out)
- lastrites (process is going to be terminated)
- dlopen() and dlclose() calls
- timer
- and some other ...

Scripting in dbx

dbx shell and language is derived from ksh88. Most Korn Shell features are available (I/O redirections, loops, built-in arithmetic, history and command line editing)

```
(dbx) set -o vi    # set vi mode (emacs is default)
```

dbx specifics:

- ``command`` (backquote) is not available, use `$(command)` instead
- `$(c-expression)` - language expression evaluation
example:

```
(dbx) RES=$(p->val * 10)
```
- csh-like history and alias arguments

Scripting in dbx

Conflicts between ksh and dbx

- Some commands
 - > print - dbx print
 - > kprint - ksh print
 - > alias - dbx alias (csh-like)
 - > kalias - ksh alias
 - > echo - alias to kprint
- I/O redirections, pipes
 - > (dbx) print 1 > 2 # comparison
 - > (dbx) { print 1 } > 2 # redirection to a file 2
 - > (dbx) { dis main, main+0x90 } | grep call
 - > (dbx) help redirection

dbx Configuration

- configuration file for dbx is .dbxrc
 - > (dbx) help .dbxrc # shows sample .dbxrc file
contains useful settings
 - > (dbx) help dbxenv # prints all available parameters

dbx GUI

- Sun Studio IDE
 - > Netbeans based GUI
 - > `sunstudio` command
 - > beside many other things, it provides a frontend for dbx
 - > multi-window environment for concurrent displaying of source code, call stack, local variables, watches, dbx command line, ...
- GNU Data Display Debugger (DDD)
 - > common graphical user interface for GDB, DBX, XDB, ...
 - > <http://www.gnu.org/software/ddd>

Some other features

- C++, Java and Fortran debugging
- run time checking
- run time fixing
- instruction level debugging
- debugging of multithreaded application
- signal handling
- and many other ...

Look at dbx manual for all details ;-)

Comparison of dbx and mdb

dbx

- > source code debugging
- > user space debugging only
- > unbundled - part of Sun Studio
- > easy scripting (ksh)
- > c-like expressions - more intuitive for beginners
- > native C, C++, Java and Fortran support
- > run time checking
- > GUI available

mdb

- > no support for source code debugging
- > both kernel and user space support
- > bundled - installed on all Solaris systems
- > specific scripting language (hard to read), modules written in C
- > mdb specific expression syntax
- > C support only (C++ names demangling available)
- > no run time checking (but has libumem support)
- > no GUI

Comparison of dbx and gdb

- Both debuggers provide similar functionality, though their command sets are totally different
- dbx provides gdb command mode: (dbx) gdb on

dbx

- > unbundled
- > optimized for Sun Studio compiled binaries and Solaris
- > ksh-compatible shell and scripting
- > run-time checking
- > no remote debugging

gdb

- > bundled (/usr/sfw/bin)
- > optimized for gcc and g++ compiled binaries
- > gdb specific shell and scripting
- > no run time checking
- > remote debugging

Where to Get dbx

- **Sun Studio 12**, from Sun Download Center (registration):
<http://developers.sun.com/sunstudio/downloads/index.jsp>
- **Sun Studio 11**, through OpenSolaris.org:
http://www.opensolaris.org/os/community/tools/sun_studio_tools

Documentation & links

- Built-in help
 - > (dbx) help help
 - > (dbx) help *<command>*
- Documentation
 - > dbx manual: <http://docs.sun.com/app/docs/doc/819-5257>
 - > </opt/SUNWspro/docs/index.html>
- Comparison of dbx and gdb commands
 - > http://blogs.sun.com/dbx/entry/gdb_vs_dbx_commands_mapping
 - > <http://www.fortran-2000.com/ArnaudRecipes/CompGdbDbx.html>
 - > http://www.dartmouth.edu/~rc/classes/soft_dev/gdb_and_dbx.html

Documentation & links

- dbx home page
 - > http://developers.sun.com/sunstudio/overview/topics/debug_index.html
- Sun Studio home page
 - > <http://developers.sun.com/sunstudio>
- Sun Studio Tools Forum
 - > <http://forum.sun.com/jive/forum.jspa?forumID=309>



THE END

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