

Ugly Debugging

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Ugly Debugging

Brute force conditional breakpoint

- Want to debug from when an exact problematic object is constructed
- Something like SwContentIndexReg
 - One triggers an assert
 - Thousands created
- To debug ideally you want a breakpoint to get the ctor of the one that will eventually assert
- manual ctor/dtor “instrumentation”
 - Dump “this” in ctor/dtor, inc static int in ctor, dump it alongside this
- dump pointers at assert
 - Search backwards for the same pointer at ctor



Ugly Debugging

export GOAL=-1

- run it twice
to ensure its
stable

export GOAL=X

- Break at
“debug here”

profit

- Smart people
use rr

```
diff --git a/sw/source/core/bastyp/index.cxx b/sw/source/core/bastyp/index.cxx
index c7ded156ea26..06304703a532 100644
--- a/sw/source/core/bastyp/index.cxx
+++ b/sw/source/core/bastyp/index.cxx
@@ -24,6 +24,9 @@

#include <crossrefbookmark.hxx>

+static int foo;
+static int goal=atoi(getenv("GOAL"));
+
SwContentIndex::SwContentIndex(const SwContentNode * pContentNode, sal_Int32 const nIndex)
    : m_nIndex( nIndex )
    , m_pContentNode( const_cast<SwContentNode*>(pContentNode) )
@@ -32,6 +35,10 @@ SwContentIndex::SwContentIndex(const SwContentNode * pContentNode, sal_Int32 con
    , m_pMark( nullptr )
{
    Init(m_nIndex);
+    fprintf(stderr, "search1 %d is %p\n", foo, this);
+    if (foo == goal)
+        fprintf(stderr, "debug here\n");
+    ++foo;
}

SwContentIndex::SwContentIndex( const SwContentIndex& rIdx, short nDiff )
@@ -231,6 +238,8 @@ SwContentIndexReg::SwContentIndexReg()

SwContentIndexReg::~SwContentIndexReg()
{
+    if (m_pFirst)
+        fprintf(stderr, "looking for %p\n", m_pFirst);
    assert(!m_pFirst && !m_pLast && "There are still indices registered");
}
```



Ugly Debugging

Which object is leaking

- Want to set a breakpoint on its ctor
- Same setup
- “instrument” ctors/dtors
- sort, uniq, find which “this” pointer that’s unbalanced
 - get its ctor sequence number
- set breakpoint in ctor based on that



Ugly Debugging

aside: stdout/stderr

- `stdout/std::cout` are buffered
 - output doesn't generally appear until buffer is full or flushed
 - newline flushes when output to terminal, but not when redirected to a file
- `stderr/std::cerr` are unbuffered
 - Less surprises



Ugly Debugging

Hardware watch

- Get the address
- Add watch on its contents
- Or watch -location
- These screenshots are from gdb's tui enable FWIW

```
sw/source/core/bastyp/index.cxx
28 static int goal=atoi(getenv("GOAL"));
29
30 SwContentIndex::SwContentIndex(const SwContentNode * pC
31     : m_nIndex( nIdx )
32     , m_pContentNode( const_cast<SwContentNode*>(pConte
33     , m_pNext( nullptr )
34     , m_pPrev( nullptr )
35     , m_pMark( nullptr )
36 {
37     Init(m_nIndex);
38     fprintf(stderr, "search1 %d is %p\n", foo, this);
39     if (foo == goal)
B+> 40     fprintf(stderr, "debug here\n");
41     ++foo;
42 }
43

multi-thre Thread 0x7ffffef5f81 In: SwContentIndex::SwContentIndex
(gdb) print m_nIndex
$1 = 0
(gdb) print &m_nIndex
$2 = (sal_Int32 *) 0x7ffffffffff3470
(gdb) watch *0x7ffffffffff3470
Hardware watchpoint 2: *0x7ffffffffff3470
(gdb)
```



Ugly Debugging

Where is the exception thrown/caught

- gdb has catch throw and catch catch
- also catch throw/catch “whatever”, which works well now

```
(gdb) catch throw deployment::DeploymentException
Catchpoint 2 (throw)
(gdb) cont
Continuing.
[New Thread 0x7fffd8a006c0 (LWP 1549368)]
[New Thread 0x7fffd3e006c0 (LWP 1549369)]

Thread 1 "soffice.bin" hit Catchpoint 2 (exception thrown), 0x00007ffff74b51e1 in __cxxa_throw () from /lib64/libstdc++.so.6
Missing separate debuginfos, use: dnf debuginfo-install dconf-0.40.0-9.fc39.x86_64
(gdb) up
#1 0x00007ffffd80fdebb in dp_registry::backend::PackageRegistryBackend::bindPackage (this=0x1a1a5d0, url="vnd.sun.star.expan
mediaType="application/vnd.sun.star.configuration-data", bRemoved=0 '\000', identifier="", xCmdEnv=uno::Reference to ((a
at /home/caolan/LibreOffice/core/desktop/source/deployment/registry/dp_backend.cxx:182
182         throw deployment::DeploymentException(
(gdb)
```



Ugly Debugging

In extremis, script with gdb

- solenv/bin/gdbtrycatchtrace
 - Dump backtrace of every try and catch
- bin/refcount_leak.py
 - Use similar to ugly leak instrumentation but script backtrace on acquire/release
 - Analyses output to sort most likely mismatched acquire to the top



Ugly Debugging

Breakpoints on mouse moves and delicate GUI operations

- Debug GUI via second computer
- ssh in from another machine
- attach to running soffice

Dump png of every individual paint frame

- export VCL_GTK3_PAINTDEBUG=1
- some keystrokes to enable/disable (F2)
- get a sequence of /tmp/frameNUMBER.png



Ugly Debugging

Brute force search for an example document

- Want to know if there if any examples of a document with a certain feature/option exists
- Take advantage of crashtesting
 - Built with `--enable-dbgutil`
 - Regular runs over $\geq 810,000$ documents
- Add asserts to get crashtesting to trigger on a candidate you are searching for
 - e.g. `assert(aExitMacro.getLength() < 33 && "seeing if following will cause problems.");`

[https://wiki.documentfoundation.org/
Development/How_to_debug](https://wiki.documentfoundation.org/Development/How_to_debug)

Thank you!

By Caolán McNamara



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