Subject: Memory management by 5.4 on Sunblade Posted by weitkamp on Mon, 17 Dec 2001 10:57:27 GMT

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Hi,

I'm mostly using IDL 5.4 on my laboratory's Linux86 cluster, and running memory-critical simulation code on it which uses lots of large temporary arrays.

Now they've bought a Sunblade as the first test machine of a future cluster, and so I tried running my code on that one, using 5.4 as before. That is,

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IDL> print,!version
{ sparc sunos unix 5.4 Sep 25 2000
                                           64}
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However, I noticed that memory management by IDL 5.4 on the Sunblade is extremely poor in that variable space "freed" by TEMPORARY, DELVAR, or simply by dynamic resizing of a variable is not actually freed but kept allocated (so tells me "top").

I wonder if this bug will persist with 5.5, which hasn't yet been installed on any machine here. Has anybody else made any experience with 5.4 or 5.5 on Sunblade in this context?

Timm

Subject: Re: Memory management by 5.4 on Sunblade Posted by John-David T. Smith on Wed, 19 Dec 2001 22:41:28 GMT View Forum Message <> Reply to Message

Timm Weitkamp wrote:

```
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- > installed on any machine here. Has anybody else made any experience
- > with 5.4 or 5.5 on Sunblade in this context?

It's not a *bug*, it's a *feature*. IDL allocates memory as necessary from the OS, and then, even if it doesn't need it any more, hangs onto it just in case. This is true I think on all platforms, and all recent versions of IDL. You still have the memory available, just not to the system as a whole.

Example:

IDL> help,/memory

heap memory used: 370549, max: 372383, gets: 297,

frees: 92

IDL> a=fltarr(256,256,256)

IDL> help,/memory

heap memory used: 67479528, max: 67479547, gets: 301,

frees: 93 IDL> a=0

IDL> help,/memory

heap memory used: 370617, max: 67479545, gets: 304,

frees: 95

So you see, the giant array used up 64MB or so. IDL allocated the memory for it, at which point 67479528 bytes of heap memory are used. When you free that variable, only 370617 bytes are used, but 67479545 bytes are still allocated. So the memory is available, just not to any other program.

JD

Subject: Re: Memory management by 5.4 on Sunblade Posted by Craig Markwardt on Thu, 20 Dec 2001 05:50:14 GMT View Forum Message <> Reply to Message

JD Smith <jdsmith@astro.cornell.edu> writes:

> Timm Weitkamp wrote:

>>

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>>

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- > versions of IDL. You still have the memory available, just not to the
- > system as a whole.

Hi JD--

I do not think this is always true. I find that I regularly create 300 MB arrays in memory, and then free them. While the procedure is running, the memory usage is indeed around 300 MB, but afterwards the memory use, as reported by the external program "top", drops down again to the quiescent level.

If I recall correctly, there was a bally-hoo in one of the What's News from ages ago about IDL using an allocator that is able to release memory back to the system. *However*, this is surely (a) extremely system dependent; and (b) not always possible depending on the fragmentation of the memory at the time. Perhaps this is what Timm is running in to.

Subject: Re: Memory management by 5.4 on Sunblade Posted by Nigel Wade on Thu, 20 Dec 2001 09:45:12 GMT View Forum Message <> Reply to Message

Timm Weitkamp wrote:

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```

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- > with 5.4 or 5.5 on Sunblade in this context?

>

> Timm

I don't think it's IDL, but the underlying OS.

AFAIK IDL uses the system memory managment provided by malloc/free. On Linux free() returns memory back to the OS when it can. Under Solaris this is not the case, so the application retains the virtual memory pages.

With good virtual memory managment this is rarely important. Physical memory is allocated on a page-by-page basis as needed by applications. Provided you have sufficient swap space to hold the virtual memory in use by all applications, and each application has sufficient limits to allow the necessary virtual memory there shouldn't be a problem. If an application holds on to a page of virtual memory which it no longer requires it only takes up space on the swap disk not in physical memory. There will be some overhead as this page is swapped out to disk, but that only occurs if some other application requires the physical memory.

--

Nigel Wade, System Administrator, Space Plasma Physics Group,

University of Leicester, Leicester, LE1 7RH, UK

E-mail: nmw@ion.le.ac.uk

Phone: +44 (0)116 2523568, Fax: +44 (0)116 2523555

Subject: Re: Memory management by 5.4 on Sunblade Posted by weitkamp on Thu, 20 Dec 2001 10:36:01 GMT

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```
Craig Markwardt <craigmnet@cow.physics.wisc.edu> wrote in message
news:<onn10etp7t.fsf@cow.physics.wisc.edu>...
> JD Smith <idsmith@astro.cornell.edu> writes:
>> Timm Weitkamp wrote:
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This is pretty much exactly the kind of thing my programs do too. On
x86 Linux all unused memory is given back to the system, on
```

This is pretty much exactly the kind of thing my programs do too. On x86 Linux all unused memory is given back to the system, on Sunblade/Solaris it isn't. You may call it a feature, but I think it is one that may cause big problems. JD, what kind of platform are you using that one shouldn't buy? :-)

Timm

Subject: Re: Memory management by 5.4 on Sunblade

```
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```

Two strikes this week. Maybe I should stick to histograms. Indeed, so much has this mis-feature been touted, that I presumed it applied everywhere. Testing on my linux system reveals Craig to be entirely correct: even as far back as v5.2.1, memory is released to the OS after it's not needed. Yet another reason to avoid Solaris, I suppose.

Here's a fun command to use to track memory usage:

% watch -n 1 'free;echo;ps -C idl -o rss,vsize,cmd'

JD

>

Subject: Re: Memory management by 5.4 on Sunblade Posted by David Fanning on Thu, 20 Dec 2001 16:57:10 GMT

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JD Smith (jdsmith@astro.cornell.edu) writes:

> Two strikes this week. Maybe I should stick to histograms.

It happens. Geez, I thought seriously about retiring a month or so ago when I had three strikes in the same day. :-(

But the best hitters always swing for the fences. :-)

Cheers,

David

--

David W. Fanning, Ph.D. Fanning Software Consulting

Phone: 970-221-0438, E-mail: david@dfanning.com

Coyote's Guide to IDL Programming: http://www.dfanning.com/

Toll-Free IDL Book Orders: 1-888-461-0155

Subject: Re: Memory management by 5.4 on Sunblade Posted by John-David T. Smith on Thu, 20 Dec 2001 18:50:14 GMT View Forum Message <> Reply to Message

```
JD Smith wrote:
```

>

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- > versions of IDL. You still have the memory available, just not to the
- > system as a whole.

I should clarify my statement: it's a *bug* or *feature* (depending on your point of view) of the memory management sub-system of your OS, not of IDL. IDL wisely relies on the host OS for memory management, and concentrates on what it does best. One of the RSI developers made a good point regarding the differing behaviors of, e.g., Solaris vs. Linux memory management: it's a tradeoff between returning memory to the system (which can be costly), and speed. As is usual in these cases, you cannot have your cake and eat it too.

Good luck,

JD