
Subject: Re: memory allocation on Macs
Posted by [Karl\[1\]](#) on Fri, 02 May 2008 16:36:06 GMT
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Yep, a process on a 32-bit OS can only address 4GB of memory. The long and complicated discussions about being able to allocate less memory on Windows had to do with how Windows partitioned the 32-bit virtual address space and virtual address space fragmentation issues.

Is a machine with 7GB of RAM making use of the 7GB, even if the OS is 32-bit?

Yes, I think, for OS X with a G5. Note that on this machine with 7GB of RAM, you could probably start a second instance of IDL and allocate 3 more 1 GB arrays and use them WITHOUT paging.

Some OS's, I dunno about OS X, will cache file I/O in this "extra" memory, which greatly speeds up file reads if you read files over and over.

I did find an article (2003) that says the G5 can support more than 4GB RAM and probably uses it as I have noted above. Note that the story may be different for Intel processors. I know that the Xeon can address more than 4GB when running a Server version of Windows and that's why you see Windows servers built on the Xeon and tons of RAM. I don't know if any of this is true for any versions of the P4.

You can also start as many instances of IDL that you want and allocate more arrays, but then you'll be subject to a drop in performance due to paging and any upper limit placed on the paging file.

The performance hit depends on the memory Working Set of the applications that are involved. If these large processes are only touching a few pages of memory (unlikely), the performance will be very good since all the needed pages fit into RAM. But increase the working set to the point where paging occurs, and the performance drops by 2 orders of magnitude, due to paging.

I think Wikipedia has some decent articles on virtual memory OS's.

In any case, if you need a single process size to exceed 4GB, use a 64-bit OS.

Karl

On May 1, 3:00 pm, pgri...@gmail.com wrote:
> Yes, I found this on one of apple's webpages:

>
> Unlike earlier versions of Mac OS, Mac OS X includes a fully-
> integrated virtual memory system that you cannot turn off. It is
> always on, providing up to 4 gigabytes of addressable space per 32-bit
> process and approximately 18 exabytes of addressable space for 64-bit
> processes.
>
> So if this is true, 32 bit processes cannot access more than 4GB of
> memory....
>
> Ciao,
> PaoloRick Towler wrote:
>> pgrigis wrote:
>>> Hi folks,
>
>>> we have pretty much exhausted the topic of memory
>>> allocation on Windows and Linux, but I don't remember
>>> any discussion about this on Mac OS.
>
>>> So, I am using IDL 6.3 on Mac OS X 10.4.11.
>
>>> I tried allocating as many 1GB array as possible,
>>> and it failed after 3 successful allocations.
>>> Now, the "Activity Monitor" indicates that at this point
>>> I have 3.6 GB of memory used and 3.4 GB free.
>>> So I am wondering why cant'I allocate a couple more
>>> of 1GB arrays?
>
>> I'm not a macatista, but a quick google search reveals that as of 10.3,
>> the per process memory limit in OS X is 4GB. That squares with what
>> you're seeing. Someone more in the know might be able to tell you
>> if/how this can be tuned. For instance using "setrlimit".
>
>> -Rick
