Subject: Re: memory allocation on Macs
Posted by Karl[1] on Mon, 05 May 2008 20:23:57 GMT
View Forum Message <> Reply to Message

On May 2, 1:13 pm, pgri...@gmail.com wrote:
> Yes, you're right that I can allocate all the 7 GB (and more) in
> different IDL
> sessions. So there seems to be a limit indeed on how much memory one
> single
> IDL session (or in general , one process) can use up, but there isn't
> a limit for
> total usage (which, though I am sure there are a number of technical
> reason
> for it, seems a bit silly, after all if the system as a whole can
> access more
> than 4 GB, why shouldn't parts of the system be allowed to do the
> same?)

Because it is a 32-bit application. One key difference between 32-bit and 64-bit applications is that the pointers maintained by a 32-bit application are 32 bits in size, and the pointers maintained by a 64-bit application are 64 bits in size. This happens at compile time. So, your 32-bit application simply cannot address more than 4GB at a time due to its fundamental pointer size. Note that a 64-bit application will have a larger storage requirement due to the larger pointers.

The memory management unit on the 32-bit CPU, something that you cannot directly access, can address more than 4GB worth of RAM since it can map more than 4GB among several processes. Here, it is probably mapping larger chunks of memory, or pages, rather than individual bytes, so it isn't as hard as it sounds. But it is the MMU that locates the memory pages assigned to a 4GB process among the 7GB of installed memory and translates their physical addresses to 32-bit virtual addresses for the 4GB process.

While there are lots of ways to emulate bigger address spaces and ways to fit bigger problems onto small machines, it may often be much easier to move to a 64-bit address space.

Karl

>
> FYI, this is a Xeon machine in Mac OS X 10.4, so it is a 64 bit
> processor
> in a 32 bit OS running a 32 bit application.

>
> Anyway, thanks to all. I can cope with reading a few arrays off the
> disk
> from time to time.
>
> Ciao,
> Paolo
