

## Re: Linux/IA-64 byte order

**Source:** <http://linux.derkeiler.com/Mailing-Lists/Kernel/2004-01/7831.html>

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To: linux-kernel@vger.kernel.org

*>I write visualisation software for astronomy. This software is used  
>all over the world, and often has to deal with very large  
>datasets. It's not uncommon to "load" a dataset (a cube) but only view  
>a small portion of it (a single plane (channel) of the cube). On  
>big-endian machines I can avoid loading data and instead use memory  
>mapping, because all the portable binary data formats are big-endian  
>(FITS, Miriad and my own).*

The SAD (Standard Astronomical Data) format is little-endian and was, in fact, developed in your home country at Mt. Stromlo and Sliding Springs Observatory.

*>In the astronomy community, big-endian machines dominate (despite the  
>growth of Linux/x86), and will always be favoured because the most  
>important data format (FITS) is big-endian. When we tender for a new  
>supercomputer, it is a requirement that it be big-endian.  
>BTW: FITS has become a NIST standard and is widely used outside the  
>astronomy community.*

Here in the US, FITS can be big-endian or little-endian depending on whether the keyword BYTEORDR equals BIG\_ENDIAN or LITTLE\_ENDIAN. Unfortunately this keyword is not always used because the byte order was never specified in the original FITS description. This naturally has led to some confusion, with some facilities adopting big endian, some adopting little endian, and some simply using the native format of the machine.

Conceptually, it is more natural to have bits and bytes increase in significance as system memory location (word address) increases. This is of course completely independent of graphical representations where bit significance increases to the left, byte significance to the left or right, and word significance to the left or right (four possible cases).

Donald Gudehus

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