



Tips, Tricks and Useful Stuff

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Title:	Little and Big Endian formats				
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Description:

What is Endianness?

- Endianness is a term used to describe how multi-byte data is stored in memory. There are two ways in which this can be done, the first being where the Most Significant Byte i.e. the “Big End” is stored first, and the second is precisely the opposite where the Least Significant Byte i.e. the “Little End” is stored first, and hence we derive the two Endian formats namely Big-Endian and Little-Endian.
- CPU or Processor architecture can be either Big-Endian or Little-Endian.
- Operating Systems and Software must be of the same Endianness as the Processors.
- The two Endian formats are incompatible.
- Some Processors are Bi-Endian where they can process data of either Endian formats by performing a byte swap from Big to Little Endian format.

Processor Endianness

- SPARC – Big-Endian
- IBM P5 – Big-Endian
- PA-RISC – Big-Endian
- Itanium IA-64 – Little-Endian, Bi-Endian capable
- Intel – Little-Endian

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O/S Endianness

- Solaris SPARC version – Big-Endian
- Solaris x86 version – Little-Endian
- AIX – Big-Endian
- HP-UX (RISC and Itanium) – Big-Endian
- Linux - Little-Endian
- Windows – Little-Endian

Bi-Endianness

- Processors can adapt to OS Endianness
- OS cannot adapt to Processor Endianness
- Bi-Endianness requires constant data conversion or 'byte swapping'
 - READ converts Big-Endian to Little-Endian format
 - WRITE converts Little to Big-Endian format
- Processor overhead for constant byte swapping

The affect of Endianness on Databases

- Database dump files are compatible between heterogeneous platforms of the same Endian format.
- Entire databases can be transported between heterogeneous platforms of the same Endian format using the Transportable Databases (TDB) feature.
- Only Tablespaces and Datafiles can be converted between heterogeneous platforms of differing Endian formats. This can be done through RMAN 'covert tablespace | datafile' or through cross platform transportable tablespaces (XTTS).

Articles and Links

- <http://www.intel.com/design/intarch/papers/ndian.pdf>
- <http://www.wisegeek.com/what-is-endianness.htm>
- <http://en.wikipedia.org/wiki/Endianness>