Subject: OPENR F77 SWAP_IF_LITTLE_ENDIAN
Posted by MarioIncandenza on Mon, 06 Apr 2015 18:04:02 GMT
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```
; open and write a file using F77_UNFORMATTED
IDL> openw,lun,/get_lun,/f77,'/tmp/test_f77'
IDL> writeu,lun,long(2015032518),float(6),long(0)
IDL> free_lun,lun
; read the file back in
IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc'
IDL> qq1=long(0) & qq2=float(0) & qq3=long(0)
IDL> readu,lun,qq1,qq2,qq3
IDL> print,qq1,qq2,qq3
  2013052306      6.00000           0
IDL> free_lun,lun
; now try reading it with /SWAP_IF_LITTLE_ENDIAN
IDL>  openr,lun,/get_lun,/f77,'/tmp/test_conc',/swap_if_little_end ian
IDL> readu,lun,qq1,qq2,qq3
% READU: Corrupted f77 unformatted file detected. Unit: 100
        File: /tmp/test_conc
% Execution halted at: $MAIN$
```

Has anyone encountered this behavior?

--Edward H.

Subject: Re: OPENR F77 SWAP_IF_LITTLE_ENDIAN
Posted by Lajos Foldy on Mon, 06 Apr 2015 19:43:11 GMT
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On Monday, April 6, 2015 at 8:04:05 PM UTC+2, Edward Hyer wrote:
> ; open and write a file using F77_UNFORMATTED
> IDL> openw,lun,/get_lun,/f77,'/tmp/test_f77'
> IDL> writeu,lun,long(2015032518),float(6),long(0)
> IDL> free_lun,lun
> ; read the file back in
> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc'
> IDL> qq1=long(0) & qq2=float(0) & qq3=long(0)
> IDL> readu,lun,qq1,qq2,qq3
> IDL> print,qq1,qq2,qq3
> 2013052306   6.00000   0
> IDL> free_lun,lun
> ; now try reading it with /SWAP_IF_LITTLE_ENDIAN
> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc',/swap_if_little_end ian
> IDL> readu,lun,qq1,qq2,qq3
> % READU: Corrupted f77 unformatted file detected. Unit: 100

> File: /tmp/test_conc
> % Execution halted at: $MAIN$
>
>
> Has anyone encountered this behavior?
>
> --Edward H.

F77 unformatted files contain record length data. Byte swapping them will result in corrupted records.

regards,
Lajos

Subject: Re: OPENR F77 SWAP_IF_LITTLE_ENDIAN
Posted by Paul Van Delst[1] on Mon, 06 Apr 2015 19:45:42 GMT
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Hello,

On 04/06/15 14:04, Edward Hyer wrote:
> ; open and write a file using F77_UNFORMATTED
> IDL> openw,lun,/get_lun,/f77,'/tmp/test_f77'
> IDL> writeu,lun,long(2015032518),float(6),long(0)
> IDL> free_lun,lun
> ; read the file back in
> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc'
> IDL> qq1=long(0) & qq2=float(0) & qq3=long(0)
> IDL> readu,lun,qq1,qq2,qq3
> IDL> print,qq1,qq2,qq3
> 2013052306 6.00000 0
> IDL> free_lun,lun
> ; now try reading it with /SWAP_IF_LITTLE_ENDIAN
> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc',/swap_if_little_end ian
> IDL> readu,lun,qq1,qq2,qq3
> % READU: Corrupted f77 unformatted file detected. Unit: 100
> File: /tmp/test_conc
> % Execution halted at: $MAIN$
>
>
> Has anyone encountered this behavior?

Yes. At least, when I read in the same file I write! (you have '/tmp/test_f77' and '/tmp/test_conc')

On my (little-endian) machine:

```
IDL> print, !version
{ x86_64 linux unix linux 8.3 Nov 15 2013      64      64}
IDL> openw,lun,/get_lun,/f77,'tmp.test_f77'
IDL> writeu,lun,long(2015032518),float(6),long(0)
IDL> free_lun,lun
IDL> openr,lun,/get_lun,/f77,'tmp.test_f77'
IDL> qq1=long(0) & qq2=float(0) & qq3=long(0)
IDL> readu,lun,qq1,qq2,qq3
IDL> print,qq1,qq2,qq3
   2015032518      6.00000           0
IDL> free_lun,lun
IDL>  openr,lun,/get_lun,/f77,'tmp.test_f77',/swap_if_little_endia n
IDL> readu,lun,qq1,qq2,qq3
% READU: Corrupted f77 unformatted file detected. Unit: 100, File:
tmp.test_f77
% Execution halted at: $MAIN$
```

This is what should happen on a little endian machine.

Now, if you're on a big-endian machine (e.g. Power chips?) then this would be strange behaviour. But, last time I checked/cared, IDL wasn't being developed anymore for those platforms (e.g. IBM AIX RISC type of thing).

cheers,

paulv

Subject: Re: OPENR F77 SWAP_IF_LITTLE_ENDIAN
Posted by Paul Van Delst[1] on Mon, 06 Apr 2015 20:00:39 GMT

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On 04/06/15 15:43, fawltylanguage@gmail.com wrote:
> On Monday, April 6, 2015 at 8:04:05 PM UTC+2, Edward Hyer wrote:
>> ; open and write a file using F77_UNFORMATTED
>> IDL> openw,lun,/get_lun,/f77,'/tmp/test_f77'
>> IDL> writeu,lun,long(2015032518),float(6),long(0)
>> IDL> free_lun,lun
>> ; read the file back in
>> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc'
>> IDL> qq1=long(0) & qq2=float(0) & qq3=long(0)
>> IDL> readu,lun,qq1,qq2,qq3
>> IDL> print,qq1,qq2,qq3
>>   2013052306   6.00000   0
>> IDL> free_lun,lun
>> ; now try reading it with /SWAP_IF_LITTLE_ENDIAN
>> IDL> openr,lun,/get_lun,/f77,'/tmp/test_conc',/swap_if_little_end ian

>> IDL> readu,lun,qq1,qq2,qq3
>> % READU: Corrupted f77 unformatted file detected. Unit: 100
>>   File: /tmp/test_conc
>> % Execution halted at: $MAIN$
>>
>>
>> Has anyone encountered this behavior?
>>
>> --Edward H.
>
> F77 unformatted files contain record length data. Byte swapping them
> will result in corrupted records.

Oh, it didn't even occur to me that the OP didn't know about the
(ubiquitous but non-standard) format of Fortran unformatted sequential
files.

For the OP (apolgoies if you do know this):

Fortran unformatted sequential files have the following structure:

   [next record length]
   [record]
   [previous record length]

repeated for each record. That is, each record is bookended with a
record marker indicating the length of the record. Having the record
length at the end of the record as well is to allow code to BACKSPACE
records like one would have had to do on magnetic tapes back in old day.

At any rate, when you byte swap the data via the
"/swap_if_little_endian" keyword, you are also byteswapping the record
markers. And that leads to potentially screwed up reads.

Doing an octal dump of the original *little-endian* file:

```
$ od -t d4 tmp.test_f77
0000000          12  2015032518  1086324736           0
0000020          12
0000024
```

Note the "12" at the beginning and end. The record is 12 bytes long.

Now lets do the same, but for a purposefully written big-endian file:

```
IDL> openw,lun,/get_lun,/f77,'be.tmp.test_f77',/swap_endian
IDL> writeu,lun,long(2015032518),float(6),long(0)
IDL> free_lun,lun
```

```
$ od -t d4 be.tmp.test_f77
0000000   201326592  -957080968       49216           0
0000020   201326592
0000024
```

Because of the byteswapping, this is the equivalent of the little-endian file when the "/swap_if_little_endian" keyword is used. When this file is read IDL thinks the record should be 201326592 bytes long. Which is isn't.

Thus, error.

cheers,

paulv

Subject: Re: OPENR F77 SWAP_IF_LITTLE_ENDIAN
Posted by MarioIncandenza on Tue, 07 Apr 2015 00:27:10 GMT
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On Monday, April 6, 2015 at 12:45:49 PM UTC-7, Paul van Delst wrote:
> This is what should happen on a little endian machine.
>

Paul,

I had somehow gotten the notion that the 'endianness' was a property of the *file*, rather than the *machine reading or writing the file*. So what I needed was for the /SWAP_IF_LITTLE_ENDIAN used on the OPENR to also be used on the OPENW (basically forcing big-endian behavior [I can't be the only person coding against a legacy system built on SGI hardward-- right?]).

Thanks for the help, and the explanation.

--Edward H.
