Subject: Re: Precision Problem
Posted by Paul Van Delst[1] on Mon, 24 Jul 2006 19:00:03 GMT
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DMac wrote:

- > Hello All,
- > Using IDL version 6.2 on a Windows XP machine I am reading in a set of
- > coordinates from a binary file (it is LiDAR data stored in LAS Version
- > 1.0 format) stored in UTM NAD83 Zone 11 and these points are stored as
- > 4 byte long integers in the binary file. The coordinates are stored
- > in the binary file with an offset such that they need to be divided by
- > 100 to obtain the actual coordinates. The binary file is read into a
- > heap variable (Data below). The X and Y coordinates are than written
- > from the heap variable into a double precision array as follows:

```
> x = dblarr(Num_pts)
> x = TEMPORARY(data.x*1.000e-002)
> y = dblarr(Num_pts)
> y = TEMPORARY(data.y*1.000e-002)
```

That is going to give you single precision arrays.

```
IDL> x=dblarr(num_pts)
IDL> x = TEMPORARY(data.x*1.000e-002)
IDL> help, x
X FLOAT = Array[100]

You need to do
IDL> x = TEMPORARY(data.x*1.000d-002)
```

IDL> help, x X DOUBLE = Array[100]

i.e. using 1.000d-002 rather than the single precision literal 1.000e-002.

I don't think the TEMPORARY() is doing anything either since the argument is an expression which is pretty much temporary already.

All you need to is:

```
scale_factor=1.0d-02
x = data.x*scale_factor
y = data.y*scale_factor
```

to get the double precision arrays at the required size.

As to why your final "y" array is bogus, I don't know. Maybe data.y is somehow buggered up prior to your scaling?. My little tests gave the expected result.

Maybe on Windows if you do a TEMPORARY(data.x*1.000e-002) is whacks the entire structure? (I hope not)

paulv

Paul van Delst Ride lots. CIMSS @ NOAA/NCEP/EMC

Eddy Merckx

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Subject: Re: Precision Problem

Posted by Bruce Bowler on Mon, 24 Jul 2006 19:19:29 GMT

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On Mon, 24 Jul 2006 09:51:40 -0700, DMac put fingers to keyboard and said:

- > shapefile. The X coordinates are fine. The X coordinates are 6 digits
- > to the left of the decimal place while the Y coordinates are 7 digits
- > to the left of the decimal place

As Paul pointed out, you're getting single precision rather then double precision.

Are the 6 and 7 digits before or after the conversion? If after, the problems are both related as 7 digits is typically the limit of the number of significant digits in a SP number (I think :-). The range is $10^{(+/-)}38$, but # of significant digits is much less.

Bruce

| People want economy and they will pay any price to Bruce Bowler

1.207.633.9600 | get it. - Lee lacocca

bbowler@bigelow.org |

+-----

Subject: Re: Precision Problem

Posted by Paul Van Delst[1] on Mon, 24 Jul 2006 19:33:03 GMT

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Bruce Bowler wrote:

> On Mon, 24 Jul 2006 09:51:40 -0700, DMac put fingers to keyboard and said:

```
>
>
```

>> shapefile. The X coordinates are fine. The X coordinates are 6 digits

>> to the left of the decimal place while the Y coordinates are 7 digits

>> to the left of the decimal place

-

> As Paul pointed out, you're getting single precision rather then double

> precision.

>

> Are the 6 and 7 digits before or after the conversion? If after, the

- > problems are both related as 7 digits is typically the limit of the number
- > of significant digits in a SP number (I think :-). The range is
- > 10^(+/-)38, but # of significant digits is much less.

Ah, yeah. I misunderstood the explanation and totaly missed the 6-7 digit clue there. I thought the y-values were just integers, no decimals at all.

You're correct. If you want more than 6/7 decimal place precision, you need double (at least, for it to be meaningful):

IDL> x=10000000.0 IDL> print, x, format='(f12.2)' 10000000.00 IDL> x=x+0.1 IDL> print, x, format='(f12.2)' 10000000.00

IDL> x=10000000.0d IDL> print, x, format='(f12.2)' 10000000.00 IDL> x=x+0.1d IDL> print, x, format='(f12.2)' 10000000.10

paulv

--

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Subject: Re: Precision Problem

Posted by Paul Van Delst[1] on Mon, 24 Jul 2006 19:34:23 GMT

Paul Van Delst wrote:

> You're correct. If you want more than 6/7 decimal place precision, you

I really should have said if you want more than 6/7 meaningful significant figures...

```
> need double (at least, for it to be meaningful):
>
> IDL> x=10000000.0
> IDL> print, x, format='(f12.2)'
> 10000000.00
> IDL> x=x+0.1
> IDL> print, x, format='(f12.2)'
> 10000000.00
>
> IDL> x=10000000.0d
> IDL> print, x, format='(f12.2)'
> 10000000.00
> IDL> x=x+0.1d
> IDL> print, x, format='(f12.2)'
> 10000000.10
> paulv
> --
```

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Subject: Re: Precision Problem
Posted by DMac on Mon, 24 Jul 2006 21:05:08 GMT
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Thanks a bunch guys. That was the problem i.e. I should use 1.000d-002 rather than the single precision literal 1.000e-002.

Solved all my problems.

I really appreciate the prompt and accurate replies.

Derek M.

Eddy Merckx

```
Paul Van Delst wrote:
> Paul Van Delst wrote:
>> You're correct. If you want more than 6/7 decimal place precision, you
> I really should have said if you want more than 6/7 meaningful significant figures...
>
>
>> need double (at least, for it to be meaningful):
>>
>> IDL> x=10000000.0
>> IDL> print, x, format='(f12.2)'
   10000000.00
>> IDL> x=x+0.1
>> IDL> print, x, format='(f12.2)'
   10000000.00
>>
>> IDL> x=10000000.0d
>> IDL> print, x, format='(f12.2)'
>> 1000000.00
>> IDL> x=x+0.1d
>> IDL> print, x, format='(f12.2)'
   10000000.10
>>
>>
>> paulv
>>
>
> Paul van Delst
                        Ride lots.
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