
Subject: "% Unable to allocate memory" when using histogram.
Posted by [Paul Van Delst\[1\]](#) on Tue, 20 Oct 2015 15:19:01 GMT
[View Forum Message](#) <> [Reply to Message](#)

Hello,

I have a utility that plots histograms of satellite data. I mention this because satellites==lots-of-data. (Although in this case, not so much)

After reading in all the data I see the following:

```
IDL> help, boxcar_obs, srf_obs
BOXCAR_OBS   STRUCT  = -> <Anonymous> Array[10600]
SRF_OBS      STRUCT  = -> <Anonymous> Array[10600]
```

Each element of the structure looks like:

```
IDL> help, BOXCAR_OBS[0]
** Structure <5424ac18>, 18 tags, length=1936, data length=1936, refs=2:
  OBS          FLOAT   Array[22]
  DEPAR_BC     FLOAT   Array[22]
  DEPAR_NBC    FLOAT   Array[22]
  ...etc...
  BIAS_SCANANGLE_TERMS
                        FLOAT   Array[22, 5]
  BIAS_SST_TERM  FLOAT   Array[22]
```

So, 18 tags of 22 element arrays of floats, except for the [22,5] array.

I calculate this to be
 $4 * 22 * 22 = 1936$ bytes
just as reported above.

So, there are 10600 of these, and two sets of data. Thus

$$1936 * 10600 * 2 = 41\text{MB}$$

No worries, right? The memory report looks similar:

```
IDL> memory(/structure)
{
  CURRENT: 47076590,
  NUM_ALLOC: 14800356,
  NUM_FREE: 14798590,
  HIGHWATER: 47076645
}
```

with 47MB reported.

For testing, I then did the following:

```
n = 100
boxcar_obs = boxcar_obs[0:n]
srf_obs = srf_obs[0:n]
memory(/structure)
```

and I got:

```
{
  CURRENT: 3904579,
  NUM_ALLOC: 16682008,
  NUM_FREE: 16680242,
  HIGHWATER: 47271996
}
```

Again, no worries. Makes sense, yeah?

Then, as I loop over each of the 22 channels I call the histogramming utility, ala:

```
for i = 0, nchan-1 do begin

  gsi_radstat_histogram, $
    boxcar_obs, $
    obsdata2 = srf_obs, $
    channel_index=i

endfor
```

I added memory output right before the histogram function is called. And I get:

channel 1

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	3910048
NUM_ALLOC	LONG	21910192
NUM_FREE	LONG	21908421
HIGHWATER	LONG	3929559

channel 2

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	7176461
NUM_ALLOC	LONG	22116633
NUM_FREE	LONG	22110660
HIGHWATER	LONG	7185333

channel 3

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	7176461
NUM_ALLOC	LONG	22296048
NUM_FREE	LONG	22290075
HIGHWATER	LONG	7185333

% Unable to allocate memory: to make array.

Cannot allocate memory

% Execution halted at: GSI_RADSTAT_HISTOGRAM 93

The offending line in question is:

```
pdf = HISTOGRAM( tb_data, $  
                BINSIZE = _binsize, $  
                LOCATIONS = xbin )
```

The error occurs at the third channel even if I DO NOT subset the data, keeping all 10600 elements e.g.:

channel 1

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	47165566
NUM_ALLOC	LONG	24028618
NUM_FREE	LONG	24026847
HIGHWATER	LONG	48098350

channel 2

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	50431979
NUM_ALLOC	LONG	24341060
NUM_FREE	LONG	24335087
HIGHWATER	LONG	51364763

channel 3

** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

CURRENT	LONG	50431979
NUM_ALLOC	LONG	24658491
NUM_FREE	LONG	24652518
HIGHWATER	LONG	51364763

It would appear (to me at least) that the physical sizes of my arrays in question are not at issue here - I get the unable-to-allocate error even if I am using a fraction of the total.

Does anyone have any idea what could be causing this error? And how to fix it?

Thanks,

paulv

p.s. I have a typical linux redhat system, 4GB memory, RHEL6

```
IDL> !version
```

```
{
  ARCH: "x86_64",
  OS: "linux",
  OS_FAMILY: "unix",
  OS_NAME: "linux",
  RELEASE: "8.3",
  BUILD_DATE: "Nov 15 2013",
  MEMORY_BITS: 64,
  FILE_OFFSET_BITS: 64
}
```

p.p.s. Potential red herring: I was having licensing issues the day before yesterday that required me to restart (to get Imgrd working properly). Unfortunately I didn't run this code that fails until today.

p.p.p.s. I have a test program for this particular histogram utility into which I put memory output as it generates six histograms:

```
IDL> test_gsi_radstat
```

```
% Compiled module: TEST_GSI_RADSTAT.
```

```
% Compiled module: READ_DIAGS.
```

```
% Compiled module: GSI_RADSTAT_HISTOGRAM.
```

```
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
```

```
  CURRENT      LONG      412374977
  NUM_ALLOC     LONG      1308019
  NUM_FREE      LONG      1307012
  HIGHWATER     LONG      421668193
```

```
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
```

```
  CURRENT      LONG      418893819
  NUM_ALLOC     LONG      1436201
  NUM_FREE      LONG      1417730
  HIGHWATER     LONG      428187035
```

```
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
```

```
  CURRENT      LONG      420167967
  NUM_ALLOC     LONG      1538103
  NUM_FREE      LONG      1512960
  HIGHWATER     LONG      429461183
```

```
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
```

```
  CURRENT      LONG      422355746
  NUM_ALLOC     LONG      1673174
```

```

NUM_FREE      LONG      1639501
HIGHWATER     LONG      431648962
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
CURRENT       LONG      423641670
NUM_ALLOC     LONG      1775399
NUM_FREE      LONG      1735101
HIGHWATER     LONG      432934886
** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
CURRENT       LONG      424951845
NUM_ALLOC     LONG      1877609
NUM_FREE      LONG      1830749
HIGHWATER     LONG      434245061

```

Note the much higher memory usage but lower NUM_ALLOC and NUM_FREE.

Subject: Re: "% Unable to allocate memory" when using histogram.
 Posted by [Lajos Foldy](#) on Tue, 20 Oct 2015 15:45:23 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Tuesday, October 20, 2015 at 5:19:04 PM UTC+2, Paul van Delst wrote:

```

> Hello,
>
> I have a utility that plots histograms of satellite data. I mention this
> because satellites==lots-of-data. (Although in this case, not so much)
>
> After reading in all the data I see the following:
>
> IDL> help, boxcar_obs, srf_obs
> BOXCAR_OBS   STRUCT   =-> <Anonymous> Array[10600]
> SRF_OBS      STRUCT   =-> <Anonymous> Array[10600]
>
> Each element of the structure looks like:
>
> IDL> help, BOXCAR_OBS[0]
> ** Structure <5424ac18>, 18 tags, length=1936, data length=1936, refs=2:
>  OBS          FLOAT    Array[22]
>  DEPAR_BC     FLOAT    Array[22]
>  DEPAR_NBC    FLOAT    Array[22]
>  ...etc...
>  BIAS_SCANANGLE_TERMS
>                   FLOAT  Array[22, 5]
>  BIAS_SST_TERM  FLOAT    Array[22]
>
> So, 18 tags of 22 element arrays of floats, except for the [22,5] array.
>
> I calculate this to be
> 4 * 22 * 22 = 1936 bytes

```

```

> just as reported above.
>
> So, there are 10600 of these, and two sets of data. Thus
>
> 1936 * 10600 * 2 = 41MB
>
> No worries, right? The memory report looks similar:
>
> IDL> memory(/structure)
> {
>   CURRENT: 47076590,
>   NUM_ALLOC: 14800356,
>   NUM_FREE: 14798590,
>   HIGHWATER: 47076645
> }
>
> with 47MB reported.
>
> For testing, I then did the following:
>
> n = 100
> boxcar_obs = boxcar_obs[0:n]
> srf_obs = srf_obs[0:n]
> memory(/structure)
>
> and I got:
>
> {
>   CURRENT: 3904579,
>   NUM_ALLOC: 16682008,
>   NUM_FREE: 16680242,
>   HIGHWATER: 47271996
> }
>
> Again, no worries. Makes sense, yeah?
>
> Then, as I loop over each of the 22 channels I call the histogramming
> utility, ala:
>
> for i = 0, nchan-1 do begin
>
>   gsi_radstat_histogram, $
>     boxcar_obs, $
>     obsdata2 = srf_obs, $
>     channel_index=i
>
> endfor
>

```

```

> I added memory output right before the histogram function is called. And
> I get:
>
> channel 1
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      3910048
>   NUM_ALLOC     LONG      21910192
>   NUM_FREE      LONG      21908421
>   HIGHWATER     LONG      3929559
>
> channel 2
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      7176461
>   NUM_ALLOC     LONG      22116633
>   NUM_FREE      LONG      22110660
>   HIGHWATER     LONG      7185333
>
> channel 3
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      7176461
>   NUM_ALLOC     LONG      22296048
>   NUM_FREE      LONG      22290075
>   HIGHWATER     LONG      7185333
> % Unable to allocate memory: to make array.
>   Cannot allocate memory
> % Execution halted at: GSI_RADSTAT_HISTOGRAM   93
>
> The offending line in question is:
>
> pdf = HISTOGRAM( tb_data, $
>                 BINSIZE  = _binsize, $
>                 LOCATIONS = xbin )
>
> The error occurs at the third channel even if I DO NOT subset the data,
> keeping all 10600 elements e.g.:
>
> channel 1
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      47165566
>   NUM_ALLOC     LONG      24028618
>   NUM_FREE      LONG      24026847
>   HIGHWATER     LONG      48098350
>
> channel 2
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
>   CURRENT      LONG      50431979
>   NUM_ALLOC     LONG      24341060
>   NUM_FREE      LONG      24335087

```

```

> HIGHWATER    LONG    51364763
>
> channel 3
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG    50431979
> NUM_ALLOC    LONG    24658491
> NUM_FREE     LONG    24652518
> HIGHWATER    LONG    51364763
>
> It would appear (to me at least) that the physical sizes of my arrays in
> question are not at issue here - I get the unable-to-allocate error even
> if I am using a fraction of the total.
>
> Does anyone have any idea what could be causing this error? And how to
> fix it?
>
> Thanks,
>
> paulv
>
>
> p.s. I have a typical linux redhat system, 4GB memory, RHEL6
> IDL> !version
> {
>   ARCH: "x86_64",
>   OS: "linux",
>   OS_FAMILY: "unix",
>   OS_NAME: "linux",
>   RELEASE: "8.3",
>   BUILD_DATE: "Nov 15 2013",
>   MEMORY_BITS: 64,
>   FILE_OFFSET_BITS: 64
> }
>
>
> p.p.s. Potential red herring: I was having licensing issues the day
> before yesterday that required me to restart (to get lmgrd working
> properly). Unfortunately I didn't run this code that fails until today.
>
>
> p.p.p.s. I have a test program for this particular histogram utility
> into which I put memory output as it generates six histograms:
>
> IDL> test_gsi_radstat
> % Compiled module: TEST_GSI_RADSTAT.
> % Compiled module: READ_DIAGS.
> % Compiled module: GSI_RADSTAT_HISTOGRAM.
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:

```



```

> CURRENT      LONG      412374977
> NUM_ALLOC    LONG      1308019
> NUM_FREE     LONG      1307012
> HIGHWATER    LONG      421668193
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG      418893819
> NUM_ALLOC    LONG      1436201
> NUM_FREE     LONG      1417730
> HIGHWATER    LONG      428187035
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG      420167967
> NUM_ALLOC    LONG      1538103
> NUM_FREE     LONG      1512960
> HIGHWATER    LONG      429461183
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG      422355746
> NUM_ALLOC    LONG      1673174
> NUM_FREE     LONG      1639501
> HIGHWATER    LONG      431648962
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG      423641670
> NUM_ALLOC    LONG      1775399
> NUM_FREE     LONG      1735101
> HIGHWATER    LONG      432934886
> ** Structure IDL_MEMORY, 4 tags, length=16, data length=16:
> CURRENT      LONG      424951845
> NUM_ALLOC    LONG      1877609
> NUM_FREE     LONG      1830749
> HIGHWATER    LONG      434245061
>
> Note the much higher memory usage but lower NUM_ALLOC and NUM_FREE.

```

Check your data min/max and _binsize. Hint:

```

IDL> help, histogram([0,1d10], binsize=1)
% Unable to allocate memory: to make array.
  Cannot allocate memory
% Execution halted at: $MAIN$

```

regards,
Lajos

Subject: Solved....Re: "% Unable to allocate memory" when using histogram.
 Posted by [Paul Van Delst\[1\]](#) on Tue, 20 Oct 2015 15:48:58 GMT
[View Forum Message](#) <> [Reply to Message](#)

Nothing to say but... D'oh!!!!

The data I was passing into the histogram was bad, i.e. values ranged from the usual -50 to +50 K, along with some 10^5 and 10^6 values.

So, in histogram with a binsize of 0.01K, I guess there would be some major memory required for that. Ehem...

Judicious application of a WHERE function to QC the data solved the problem.

Apologies to anyone who read my original post and wasted brain cycles.

(scurries away, back into dark corner....)

cheers,

paulv

On 10/20/15 11:19, Paul van Delst wrote:

> Hello,
>
> I have a utility that plots histograms of satellite data. I mention this
> because satellites==lots-of-data. (Although in this case, not so much)
>
...original post elided...

Subject: Re: "% Unable to allocate memory" when using histogram.

Posted by [Paul Van Delst\[1\]](#) on Tue, 20 Oct 2015 15:51:05 GMT

[View Forum Message](#) <> [Reply to Message](#)

On 10/20/15 11:45, fawtlanguage@gmail.com wrote:

>
> Check your data min/max and _binsize. Hint:
>
> IDL> help, histogram([0,1d10], binsize=1)
> % Unable to allocate memory: to make array.
> Cannot allocate memory
> % Execution halted at: \$MAIN\$

That was exactly it, Lajos. (See my self-reply)

Thanks,

paulv
