Subject: External development: Populating a complex array in C
Posted by dg86 on Sat, 25 Jul 2015 18:08:28 GMT
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Dear Folks,

I'm trying to write a DLL in C that returns a complex array to IDL.
I can create the (temporary) array with no trouble:

```
char * pd;
IDL_VPTR idl_array;
IDL_MEMINT dim[IDL_MAX_ARRAY_DIM];

dim[0] = 512;
dim[1] = 512;
pd = IDL_MakeTempArray(IDL_TYP_COMPLEX, 2, dim, IDL_ARR_INI_ZERO, &idl_array);
```

Next, I'd like to populate the idl_array with values, ideally using memcpy for
speed and clarity.  Attempts resembling

```
memcpy(pd, src, 512*512*sizeof(float));
```

seem not to change the data in idl_array.  Does anyone know the right way
to copy floating point data from the C src array to the idl_array?

Alternatively, does anyone know how to convert two IDL_TYPE_FLOAT arrays
into one IDL_TYPE_COMPLEX array along the lines of the COMPLEX(real,imag)
function in IDL?

Many thanks,

David

Subject: Re: External development: Populating a complex array in C
Posted by Heinz Stege on Sat, 25 Jul 2015 21:18:03 GMT
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Hi David.

On Sat, 25 Jul 2015 11:08:28 -0700 (PDT), David Grier wrote:

> [...]
>
> Next, I'd like to populate the idl_array with values, ideally using memcpy for
> speed and clarity.  Attempts resembling
>
>     memcpy(pd, src, 512*512*sizeof(float));

>
Just an idea: The size of the complex array is 512*512. A complex
number consists of two floats. So shouldn't you copy
512*512*sizeof(float)*2 bytes?

> seem not to change the data in idl_array.  Does anyone know the right way
> to copy floating point data from the C src array to the idl_array?
>
> Alternatively, does anyone know how to convert two IDL_TYPE_FLOAT arrays
> into one IDL_TYPE_COMPLEX array along the lines of the COMPLEX(real,imag)
> function in IDL?
>
Yes, here is an example:
```
  real=findgen(5)
  imag=4.-findgen(5)
  comp=complex(real,imag)
  help,comp
  print,comp
```
IDL prints:
```
  COMP            COMPLEX   = Array[5]
  (     0.000000,      4.00000)(      1.00000,      3.00000)
  (      2.00000,      2.00000)(      3.00000,      1.00000)
  (      4.00000,     0.000000)
```

Cheers, Heinz

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Subject: Re: External development: Populating a complex array in C
Posted by Heinz Stege on Sun, 26 Jul 2015 10:51:46 GMT
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On Sat, 25 Jul 2015 23:18:03 +0200, Heinz Stege wrote:

> On Sat, 25 Jul 2015 11:08:28 -0700 (PDT), David Grier wrote:
>
>> Alternatively, does anyone know how to convert two IDL_TYPE_FLOAT arrays
>> into one IDL_TYPE_COMPLEX array along the lines of the COMPLEX(real,imag)
>> function in IDL?
>>
> Yes, here is an example:
>    real=findgen(5)
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>    help,comp
>    print,comp
> IDL prints:
>    COMP            COMPLEX   = Array[5]
>    (     0.000000,      4.00000)(      1.00000,      3.00000)

>  (  2.00000,  2.00000)(  3.00000,  1.00000)
>  (  4.00000,  0.000000)
>
This obviously is not what you wanted to ask for. Sorry for not
realizing the meaning of "along the lines of".

You may be interested in the function
  IDL_VPTR IDL_CvtComplex(int argc, IDL_VPTR argv[]).
The External Development Guide says, that this function is the direct
implementation of the IDL command COMPLEX.

Cheers, Heinz

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Subject: Re: External development: Populating a complex array in C
Posted by dg86 on Sun, 26 Jul 2015 11:54:55 GMT
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On Sunday, July 26, 2015 at 6:51:41 AM UTC-4, Heinz Stege wrote:
> On Sat, 25 Jul 2015 23:18:03 +0200, Heinz Stege wrote:
>
>> On Sat, 25 Jul 2015 11:08:28 -0700 (PDT), David Grier wrote:
>>
>>> Alternatively, does anyone know how to convert two IDL_TYPE_FLOAT arrays
>>> into one IDL_TYPE_COMPLEX array along the lines of the COMPLEX(real,imag)
>>> function in IDL?
>>>
>> Yes, here is an example:
>>  real=findgen(5)
>>  imag=4.-findgen(5)
>>  comp=complex(real,imag)
>>  help,comp
>>  print,comp
>> IDL prints:
>>  COMP  COMPLEX  = Array[5]
>>  (  0.000000,  4.00000)(  1.00000,  3.00000)
>>  (  2.00000,  2.00000)(  3.00000,  1.00000)
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> This obviously is not what you wanted to ask for. Sorry for not
> realizing the meaning of "along the lines of".
>
> You may be interested in the function
>  IDL_VPTR IDL_CvtComplex(int argc, IDL_VPTR argv[]).
> The External Development Guide says, that this function is the direct
> implementation of the IDL command COMPLEX.
>
> Cheers, Heinz

IDL_CvtComplex() is just what I was looking for. The documentation for this command is incorrect (wrong function signature) and incomplete (no examples), but I got it working. Here's a code snippet for my solution:

```
IDL_MEMINT dim[IDL_MAX_ARRAY_DIM];
IDL_VPTR idl_real, idl_imag, idl_cmp, idl_argv[2];
char *pr, *pi;

dim[0] = width;   // width and height are defined elsewhere
dim[1] = height;
pr = IDL_MakeTempArray(IDL_TYP_FLOAT, 2, dim, IDL_ARR_INI_NOP, &idl_real);
pi = IDL_MakeTempArray(IDL_TYP_FLOAT, 2, dim, IDL_ARR_INI_NOP, &idl_imag);
idl_argv[0] = idl_real;
idl_argv[1] = idl_imag;

// Put data into idl_real and idl_imag -- I used cudaMemcpy() for my application

idl_cmp = IDL_CvtComplex(2, idl_argv, NULL);

// Free temporary resources
IDL_Deltmp(idl_real);
IDL_Deltmp(idl_imag);
```

Many thanks for pointing me in the right direction.

All the best,

David