
Subject: Backing store issue

Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 18:56:08 GMT

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I'm running IDL 6.2 on a SUN Blade 2000 running Solaris 8.0

I'm having a weird backing store problem. I have an application in which I sometimes display very large images (eg 23123 x 3193 pixels).

What I do is create a scrolled draw widget of the same size as the image and tv the image into that window. Then, I get to scroll around the image very rapidly without having to issue any commands to redraw the parts that become visible. It seems this should work fine as long as the video card has enough memory.

However, the behaviour I am seeing seems as though IDL thinks the video card has enough memory to handle the requests, when it really doesn't. Is there any way to check for this?

By default, I use RETAIN=2, so that IDL is doing the redrawing for me rather than the window manager (as this is usually less prone to problems).

I sometimes issue an explicit redraw command to redraw the entire image, when I have changed the stretch limits or something other display property of the image.

Under a certain size image, everything works fine. Unfortunately, when the images get to be larger than a certain size, the redrawing on scrolling often gives me garbage. There's got to be some tie-in with the graphics card, but I think there may also be a tie-in with IDL, since I'm using RETAIN=2.

Symptoms:

RETAIN=0, initial visible portion draws correctly, scrolling just shows black everywhere else. If I scroll back to a place that was drawn fine before, it will be black. Doing an explicit redraw will redraw the visible portion. All this is as expected since I am not generating expose events.

RETAIN=1, initial visible portion draws correctly, scrolling shows black everywhere else. If I scroll back to a place that was drawn fine before, it will still look fine. Doing an explicit redraw will redraw the currently visible portion. Any portion that was visible during any redraw operation seems to stick around in the backing store, everywhere else is black.

RETAIN=2, initial visible portion looks like garbage. Scrolling

usually shows garbage. If you scroll slowly enough vertically (either up or down), the part of the image that scrolls into view will look OK.

Scrolling horizontally will produce garbage regardless of the scrolling speed.

If I am running on the SUN, but displaying on my Windows laptop, everything works fine regardless of image size.

video card on SUN Workstation: Sun XVR-1200

video card on my Windows box: NVIDIA GeForce4 4200 Go (Dell Mobile)

Any advice on how to figure out what's going on appreciated.

Thanks.

-Jonathan

Subject: Re: Backing store issue

Posted by [David Fanning](#) on Mon, 27 Mar 2006 19:23:08 GMT

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Jonathan Joseph writes:

> I'm having a weird backing store problem. I have an application in
> which I sometimes display very large images (eg 23123 x 3193 pixels).

Uh, if you don't mind my saying so, you put too much faith in technology. :-)

I'd use the APP_SCROLL, and redraw when something comes into view. It will be SO much more reliable!

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: Backing store issue

Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 19:37:01 GMT

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Technology-schmology. It's speed I'm interested in. I use app_scroll

in another application that will view the same images without any problems, and the scrolling is *MUCH* slower if you have any reasonably sized viewing window - like 1000 x 1000 pixels.

Sure app_scroll may be more reliable, but it doesn't make me happier.

And when I'm paying big \$\$ for applications like IDL and pricey video cards, I expect them to work as advertized. OK, so I'm not paying - but somebody is :-)

-Jonathan

David Fanning wrote:

> Jonathan Joseph writes:
>
>
>> I'm having a weird backing store problem. I have an application in
>> which I sometimes display very large images (eg 23123 x 3193 pixels).
>
>
> Uh, if you don't mind my saying so, you put too
> much faith in technology. :-)
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> I'd use the APP_SCROLL, and redraw when something comes
> into view. It will be SO much more reliable!
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> Cheers,
>
> David

Subject: Re: Backing store issue
Posted by [David Fanning](#) on Mon, 27 Mar 2006 19:41:44 GMT
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Jonathan Joseph writes:

> Technology-schmology. It's speed I'm interested in. I use app_scroll
> in another application that will view the same images without any
> problems, and the scrolling is *MUCH* slower if you have any reasonably
> sized viewing window - like 1000 x 1000 pixels.

When scrolling, usually only a *few* rows or columns need to be drawn. Most of what you need is already on the display, it just has to be moved with DEVICE COPY. Surely, *this* is fast enough! :-)

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: Backing store issue

Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 20:24:18 GMT

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David,

I was afraid you were going to write something like that and expose me for the hack-programmer that I am.

I suppose I could (and will have to) do as you say, but I still believe that I shouldn't have to write this code when RSI claims to have written it for me. I think IDL should be querying the video card and if it doesn't have enough memory for the request, then IDL should either use some other method or at least give me an error message - not just give me garbage in the window.

If I program it myself, maybe I won't get it right. Maybe the programmers at RSI didn't get it right, which is why it works only when I scroll a few lines at a time (and only in the vertical direction), and not when I scroll faster.

-J

David Fanning wrote:

>

> When scrolling, usually only a *few* rows or columns need
> to be drawn. Most of what you need is already on the display,
> it just has to be moved with DEVICE COPY. Surely, *this*
> is fast enough! :-)

>

> Cheers,

>

> David

Subject: Re: Backing store issue

Posted by [David Fanning](#) on Mon, 27 Mar 2006 20:36:23 GMT

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Jonathan Joseph writes:

- > I was afraid you were going to write something like that and expose me
- > for the hack-programmer that I am.

Not up to speed with DEVICE COPY!? What do you use when you need smoke and mirrors? :-)

- > I suppose I could (and will have to) do as you say, but I still believe
- > that I shouldn't have to write this code when RSI claims to have written
- > it for me. I think IDL should be querying the video card and if it
- > doesn't have enough memory for the request, then IDL should either use
- > some other method or at least give me an error message - not just give
- > me garbage in the window.
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- > If I program it myself, maybe I won't get it right. Maybe the
- > programmers are RSI didn't get it right, which is why works only when I
- > scroll a few lines a time (and only in the vertical direction), and not
- > when I scroll faster.

Having confronted the issue of backing store memory MANY times, I'm pretty much convinced that no sane programmer could possibly get it right. Every OS, every graphics card, seems to do it differently. I have a program that supposedly checks to see how much pixmap memory is available, but it returns different results depending on the phase of the moon and what I ate for breakfast. I always divide the result by two, just to be on the safe side, and even that sometimes doesn't work. (With some cards, the **shape** of the window matters more than the **size** of the window. Go figure...)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: Backing store issue

Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 20:40:44 GMT

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I just realized that,

Even if I code it the way you say, I will still see clunkiness if I grab

the slider and slide it fast - or if I scroll by holding my mouse button down in the scroll bar but not on the thumb. Then it will go a screen at a time, and there won't be anything to DEVICE COPY.

Using retain=2 (or 1) gives me fast scrolling under all circumstances (when it works as advertised).

-J

David Fanning wrote:

>
> When scrolling, usually only a *few* rows or columns need
> to be drawn. Most of what you need is already on the display,
> it just has to be moved with DEVICE COPY. Surely, *this*
> is fast enough! :-)
>
> Cheers,
>
> David

Subject: Re: Backing store issue

Posted by [David Fanning](#) on Mon, 27 Mar 2006 20:58:21 GMT

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Jonathan Joseph writes:

> I just realized that,
>
> Even if I code it the way you say, I will still see clunkiness if I grab
> the slider and slide it fast - or if I scroll by holding my mouse button
> down in the scroll bar but not on the thumb. Then it will go a screen
> at a time, and there won't be anything to DEVICE COPY.
>
> Using retain=2 (or 1) gives me fast scrolling under all circumstances
> (when it works as advertised).

I'm not saying these are perfect solutions. I'm just saying you are creating one BIG window! It doesn't surprise me (given my experience with pixmaps and backing store) you are having problems. I would be more surprised if you weren't having problems. :-)

Cheers,

David

P.S. You could always write machine-specific code and let the guys on the SUN get by with sluggish graphic performance. They might even be used to it. :-)

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: Backing store issue
Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 21:20:51 GMT
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So be it.

Thanks for your insights David.

-Jonathan

David Fanning wrote:

> I'm not saying these are perfect solutions. I'm
> just saying you are creating one BIG window! It doesn't
> surprise me (given my experience with pixmaps and
> backing store) you are having problems. I would be
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> P.S. You could always write machine-specific code
> and let the guys on the SUN get by with sluggish
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Subject: Re: Backing store issue
Posted by [Karl Schultz](#) on Mon, 27 Mar 2006 21:48:30 GMT
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On Mon, 27 Mar 2006 16:20:51 -0500, Jonathan Joseph wrote:

What happens if you try:

device, true=24, decomposed=1

```
window, xsize=23000, ysize=3000, retain=2  
tv, bindgen(3,23000, 3000), /true
```

?

On my linux box with nvidia FX 500, the large window repairs automatically, as it should, when I drag it around or drag other things on top of it.

If I make the window a LOT larger, say 23000 x 23000, I get a nice error from IDL saying that there are not enough resources to allocate a pixmap, which is what IDL uses for backing store when RETAIN=2.

It would be interesting to know how the above code behaves on your machine.

Karl

```
> So be it.  
>  
> Thanks for your insights David.  
>  
> -Jonathan  
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>> the SUN get by with sluggish graphic performance. They might even be  
>> used to it. :-)  
>>
```

Subject: Re: Backing store issue
Posted by [Jonathan Joseph](#) on Mon, 27 Mar 2006 22:44:21 GMT
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The code you've given doesn't have the desired effect on the Sun because it will limit the size of the window it creates to the size of the screen. So it's not a valid test.

If I give my program a large enough image to open though, I get the same kind of error you are probably seeing.

% WIDGET_CONTROL: Unable to create X windows pixmap (BadAlloc (insufficient resources for operation)).

The program then runs, but with no backing store. This is probably what it should do in the case where I am seeing garbage.

It seems only to be in a grey area inbetween where it will create the pixmap, but the pixmap will end up with some garbage in it.

I think David has pretty well assessed the situation.

-Jonathan

Karl Schultz wrote:

```
> On Mon, 27 Mar 2006 16:20:51 -0500, Jonathan Joseph wrote:
>
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>
> device, true=24, decomposed=1
> window, xsize=23000, ysize=3000, retain=2
> tv, bindgen(3,23000, 3000), /true
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> which is what IDL uses for backing store when RETAIN=2.
>
> It would be interesting to know how the above code behaves on your machine.
>
> Karl
>
>
```

Subject: Re: Backing store issue

Posted by [liamgumley](#) on Tue, 28 Mar 2006 16:59:04 GMT

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Jonathan,

Have you looked at the ENVI display paradigm? If not, you may want to install the ENVI demo to see how it handles large images.

Liam.

Practical IDL Programming

<http://www.gumley.com/>

Jonathan Joseph wrote:

> The code you've given doesn't have the desired effect on the Sun because
> it will limit the size of the window it creates to the size of the
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> I think David has pretty well assessed the situation.
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> -Jonathan

Subject: Re: Backing store issue

Posted by [Karl Schultz](#) on Tue, 28 Mar 2006 18:03:48 GMT

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OK, I was just trying to help by trying to isolate the problem to the X server or to IDL.

It is probably your window manager that believes no one wants to see a window bigger than the root window and so prevents clients from creating large windows. There's probably a setting for the wm that controls this.

Aside from that, I think I agree with you guys that the copy is failing in the X server. This guess is supported somewhat by the observation that vertical scrolls work better than horizontal ones. Vertical rows of pixels are much easier to move around in video memory because they are naturally more contiguous than a few horizontal columns. The server is probably failing to find a block of the right size in vid memory to

perform the blit, and then quietly fails. It is too bad we don't see a protocol error for this.

Aside from the ENVI stuff Liam mentioned, you also might want to take a look at Object Graphics and the IDLgrImage object. We improved IDLgrImage to use textures for storing/rendering images which really works better on modern graphics cards. In IDL 6.2, we added LOD support and facilities for handling huge images with tiling.

Karl

On Mon, 27 Mar 2006 17:44:21 -0500, Jonathan Joseph wrote:

```
>
> The code you've given doesn't have the desired effect on the Sun because
> it will limit the size of the window it creates to the size of the
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> Karl Schultz wrote:
>
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>> It would be interesting to know how the above code behaves on your
>> machine.
>>
>> Karl
>>
>>

Subject: Re: Backing store issue
Posted by [K. Bowman](#) on Tue, 28 Mar 2006 18:24:22 GMT
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In article <pan.2006.03.28.18.03.44.500000@rsinc.com>,
Karl Schultz <k____schultz@rsinc.com> wrote:

> Aside from the ENVI stuff Liam mentioned, you also might want to take a
> look at Object Graphics and the IDLgrImage object. We improved IDLgrImage
> to use textures for storing/rendering images which really works better on
> modern graphics cards. In IDL 6.2, we added LOD support and facilities
> for handling huge images with tiling.

LOD = Length of Day?

Ken Bowman

Subject: Re: Backing store issue
Posted by [Paul Van Delst\[1\]](#) on Tue, 28 Mar 2006 18:45:45 GMT
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Kenneth Bowman wrote:

> In article <pan.2006.03.28.18.03.44.500000@rsinc.com>,
> Karl Schultz <k____schultz@rsinc.com> wrote:
>
>
>> Aside from the ENVI stuff Liam mentioned, you also might want to take a
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>> to use textures for storing/rendering images which really works better on
>> modern graphics cards. In IDL 6.2, we added LOD support and facilities

>> for handling huge images with tiling.
>
>
> LOD = Length of Day?

Lots Of Dots?

A huge image will have lots and lots of dots so maybe LALOD support is required.

ehem.

paulv

--

Paul van Delst
CIMSS @ NOAA/NCEP/EMC

Subject: Re: Backing store issue
Posted by [Karl Schultz](#) on Tue, 28 Mar 2006 19:31:29 GMT
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On Tue, 28 Mar 2006 12:24:22 -0600, Kenneth Bowman wrote:

> In article <pan.2006.03.28.18.03.44.500000@rsinc.com>,
> Karl Schultz <k____schultz@rsinc.com> wrote:
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>> Aside from the ENVI stuff Liam mentioned, you also might want to take a
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>> to use textures for storing/rendering images which really works better on
>> modern graphics cards. In IDL 6.2, we added LOD support and facilities
>> for handling huge images with tiling.
>
> LOD = Length of Day?
>
Sorry about that. Level of Detail. If you "zoom out" on a very large image so that you have the entire image in the viewport, you can supply IDLgrImage with downsampled image tiles. It is a little bit like texture mip-mapping.
