

## Re: advices on sockets

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In article

<c59bd765-7adc-4e11-a022-189e4433dfd0@xx>, mast4as <[mast4as@xxxxxxxxx](mailto:mast4as@xxxxxxxxx)> wrote:

Hi everyone,

Yes I spend quite some time (2 days) reading tutorials, man pages on sockets and related topics but still can't seem to find the proper way of doing what I need. It's not so much that it's impossible, it's just that I don't have the knowledge and seek over people's experiences on this topic ;-)

The little app I need to write is a x-window to which a graphic program sends an image. The graphic program renders a frame and send it to the x-window in tiles (blocks of pixels). I ended up deciding to implement that with a server (x-window) -client (graphic app) type of model. The reason is that eventually several "instances" of the graphic program can run on the computer at the same time and the images that each "instance" works on, needs to be send to the same window.

The other condition is that the x-window stays active even though the graphic app has finished processing the frame. The user can therefore continue manipulating the frame in the x-window (zooming, panning, etc...)

Now I must say I am trying to prototype things here, some I just want to find a simple, elegant and robust way to do that. I am not a socket expert (obviously), have very modest programming skills in comparison to you all... So I am just really asking for a bit of supervision here, with something I can't seem to find any answers for in posts tutorials on the web. So please be kind ;-)

I have many question regarding this problem...

1/ on the client side (the graphic app), I'd like to start to the server (the x-window) if it's not running yet. This yields 2 sub-questions:

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1.1 what's the best way to find out that the server is not running ?  
Is that fact  
that a call to connect() fails is enough ?

Yes.

1.2 is there a way I can start my server/x-window code by another  
mean that  
calling the function exec() ? I am asking that question because it  
means the  
code for the server has to be compiled as a separate app. Can I  
avoid that?  
Can I write the code for the x-window/server with the code of the  
client and  
start the x-window from within the graphics app as a \*separate  
process\* that  
won't die when the graphics app has finished processing the image ?

Yes. You could write it as a subroutine in your program, and use fork()  
to start a new process. In the new process you would call this  
subroutine, while the original process would go back to trying to  
connect.

You might also want to arrange some additional communication between the  
parent and child process, so that the child can tell the parent when it  
has started the server. Otherwise, if the parent tries to connect too  
soon, it might think it needs to start the server again. You could use  
a semaphore for this.

2/ my other problem (thing I am not clear about) is the way I am  
passing the data from the client (graphics app) and the server (x-  
window). I have also 2 questions for this.

2.1 ok i read in the docs that by default, accept() is blocking.

Remember that I

wrote at the beginning of the post that I want the x-window app to  
run as an

independent process from the graphics app and that the user can  
manipulate

the frame in the x-window using shortcuts for example (z = zoom in,  
Z = zoom

out, or 'q' to quit the x-window program). So the x-display/server  
program needs

to check for both new data coming through the socket but also X  
events. If I use

a loop to check for new connections from clients, because accept()  
is blocking,

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it stops me from checking X-events.

```
// this for example doesn't work because accept is blocking
while(1) {
checkXEvent(&c);
if (c=='q')
quit = 1;
if (accept(sockfd, ...) == -1)
continue;
// we have an incoming connection with a client, proceed..., fork
to create a
// a process child and treat packed of incoming data
...
}
```

so my question here is the following. Is the only way to do this is by making the socket non-blocking ? But in that case, isn't the fact that having a non-blocking socket uses a lot of unnecessary CPU resources (because it never stops checking if there's an incoming connection).

You need to use `select()` to listen for activity on multiple sockets at once. Or you can use threads, where one thread waits for new connections, and other threads process existing connections. If you only expect a small number of clients this can be an easier way to program it.

I played with `select()` (commented part of my code) but it didn't work. In particular my understanding is that if I use `select()` I can't use the fork technique anymore. In other words if 2 instances of the graphics app processing 2 images are running at the same time, the file descriptor set will contain 2 file descriptors (one for each connection it has had from the 2 running clients). Meaning if the 2 clients send data to the sever at the same time, I will have to read the data from each client and do i need to do with that data sent. Is that a better way than fork ?

This is where threads may make things easier. When a connection comes in, start a new thread that reads from that client.

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2.2 to pass the data i didn't find anything better that coming up with a stupid type of protocol. I send a request to the server first that tells it what it should expect to read next (some info about the size of the incoming tile, or the RGB data for the tile). In the little prototype I worked on it seems to work but I am not sure it's reliable ? Is it how you would do it ? Is there a better way ?

For a simple application like this, your "stupid protocol" may be best.

I put the code online with you have the patience and the kindness to have a look

<http://www.scratchapixel.com/docs/proto.cpp> // sim graphics app  
<http://www.scratchapixel.com/docs/server.cpp> // sim server/x-window

I really apologize for that long post, but hopefully it will have some interesting answers and will help me and other people in the future, as a part from basic client-server code examples that deals with buff[1024], I didn't find anything else out there that answered clearly those questions.

Thank you so much -coralie

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\*\*\* PLEASE don't copy me on replies, I'll read them in the group \*\*\*

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