Assignment 3
Unreliable Networking

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Goals

- Implement simple unreliable datagrams (“messages”).
- Minithreads can send messages between machines, or between threads.
- Models UDP, the user datagram protocol in the Internet protocol family.

Ports and messages

- A message is a sequence of bytes addressed to a particular port on a particular machine.
- A *miniport* is a port number + machine address pair.
- A local miniport (a port on this machine) can also be used to receive messages.

What you get

- We give you *network_address_t*, and functions to manipulate it. (See network.h)
- Treat it as an opaque type, and don't reach inside it.
- We give you network interrupts: set up handler via *network_initialize()*
- Give you *network_send_pkt()* to do sends.

What you build

- Sending messages: *minimsg_send*()
- Message is either sent out over the wire with appropriate headers, or else delivered locally.
- Don’t call out to hardware for local sends
- Receiver should call *minimsg_receive*()
- Blocks until message arrives

Concurrency

- Ports should be thread-safe:
- Multiple threads can call receive, in which case each datagram will be delivered to exactly one of them. (Which one is arbitrary).
- Multiple concurrent sends should send out complete datagrams (ordering is arbitrary).

Packets have headers

- A packet needs a header specifying who should receive it -- hardware may be broadcast, after all.
- Add src and dest (addr:port) pairs
- Also add a message type field
- Need length of body
- And then a body....

Some other things to build

- Also need some functions to manage ports.
  - minimsg_initialize()
  - miniport_local_create()
  - miniport_remote_create()
  - miniport_destroy()

Struct is something like...

- struct minimsg_hdr {

  network_address_t src_addr, dst_addr;

  short src_port, dst_port;

  int msg_type, msg_len;

  }

Gotchas

- Don’t network_send to local addresses.
- Don’t leak memory
- Be careful with the returned port from receive. Don’t want to free local ports!
- You shouldn’t use sscanf/sprintf to make headers. Just send binary data.

Questions?

- Anyone used scheduling features of CMS?
- Come up and sign up for design doc reviews. I didn’t print out sheet -- talk to me.
- Your questions: now’s the time...I’m not around this weekend.