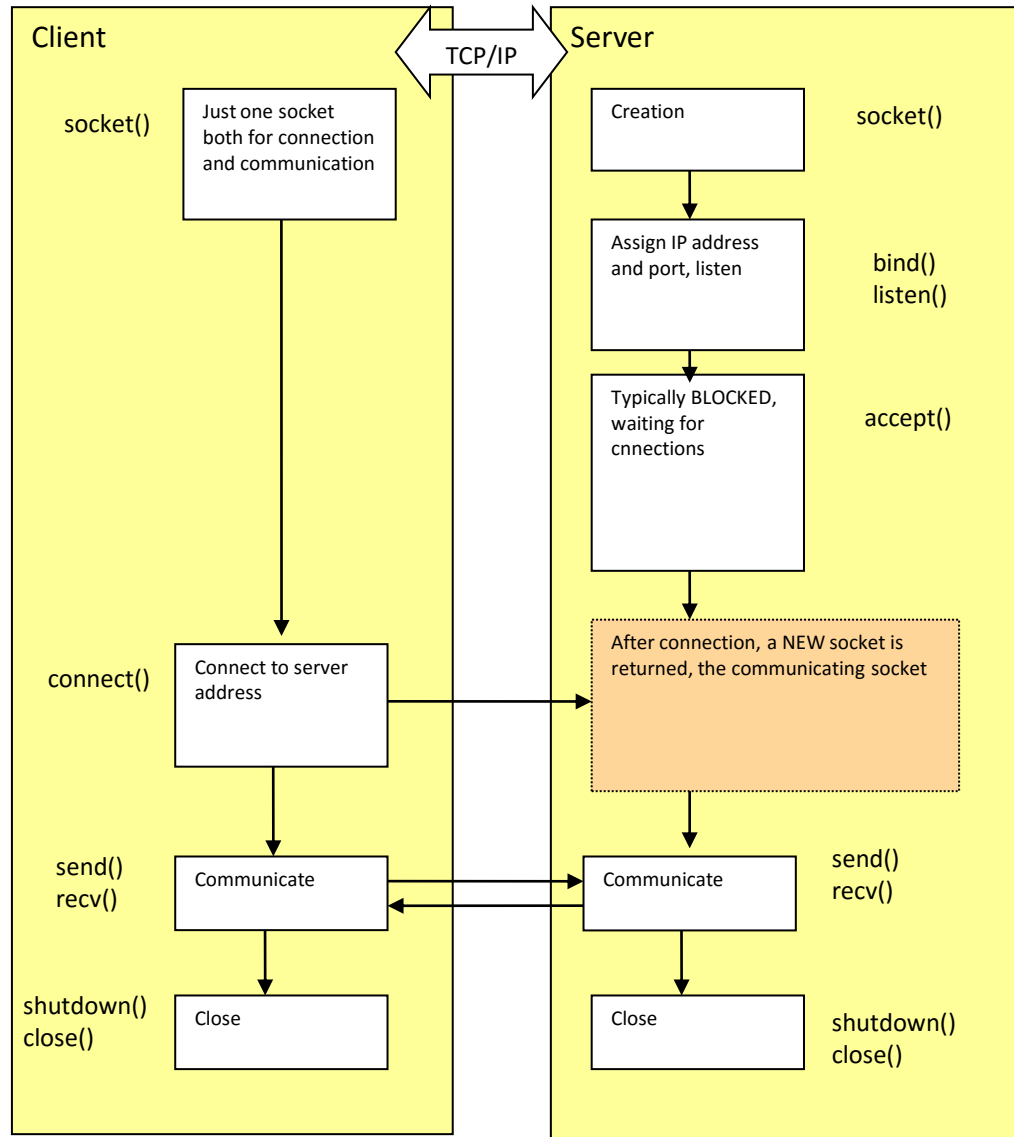


Intro to distributed systems in C/C++ with ZMQ

@diegorlosada

Meetup C++, Sydney 17-Jun-2016

Raw sockets



Raw sockets

- WSAStartup in Win
- Endian-ness
- ...

I would like to add you to my network and upgrade you to Windows 10



Hi! I noticed you are a software developer. Would you like me to fill your inbox with unsolicited messages from recruiters?

Yes

Yes



Other: nanomsg

- Licence: MIT
- Pure C
- Cleaner API
- Internals efficient:
 - Zero-copy
 - Thread-safety
- Cons:
 - Not as stable, mature

Other: Cap'n'proto

- Cap'n Proto is an insanely fast data interchange format
- RPC system. Asyn.
- Think JSON, except binary.
- Use padding (zeroes), then compress to send over the wire, achieve < size than Protobuf

```
struct Person {
    id @0 :UInt32;
    name @1 :Text;
    email @2 :Text;
    phones @3 :List(PhoneNumber);

    struct PhoneNumber {
        number @0 :Text;
        type @1 :Type;

        enum Type {
            mobile @0;
            home @1;
            work @2;
        }
    }

    employment :union {
        unemployed @4 :Void;
        employer @5 :Text;
        school @6 :Text;
        selfEmployed @7 :Void;
        # We assume that a person is only one of these.
    }
}

struct AddressBook {
    people @0 :List(Person);
}
```

ZeroMQ: Sockets on steroids



- Pieter Hintjens (@hintjens)
- ZeroMQ:
 - Widely used in industry
 - Multiple languages implementations (python, Java)
- Characteristics:
 - Lightweight, multiplatform
 - Very high throughput
 - Carry messages (like UDP)
 - Multiple patterns: pub/sub, request/reply,...
 - TCP, IPC, PGM
 - No serialization, no protocol
 - License: LGPL



ZeroMQ

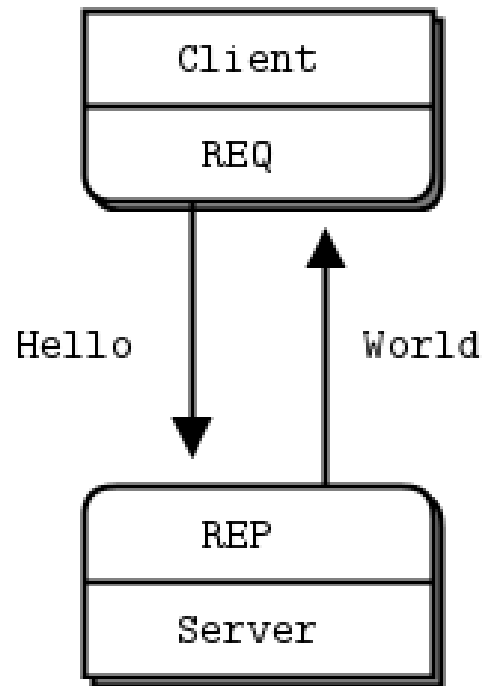
- libzmq
- zmqcpp
- Czmq
- zmqpp
- Malamute broker
- Zyre
- zproto
- ...

Check <https://github.com/zeromq>

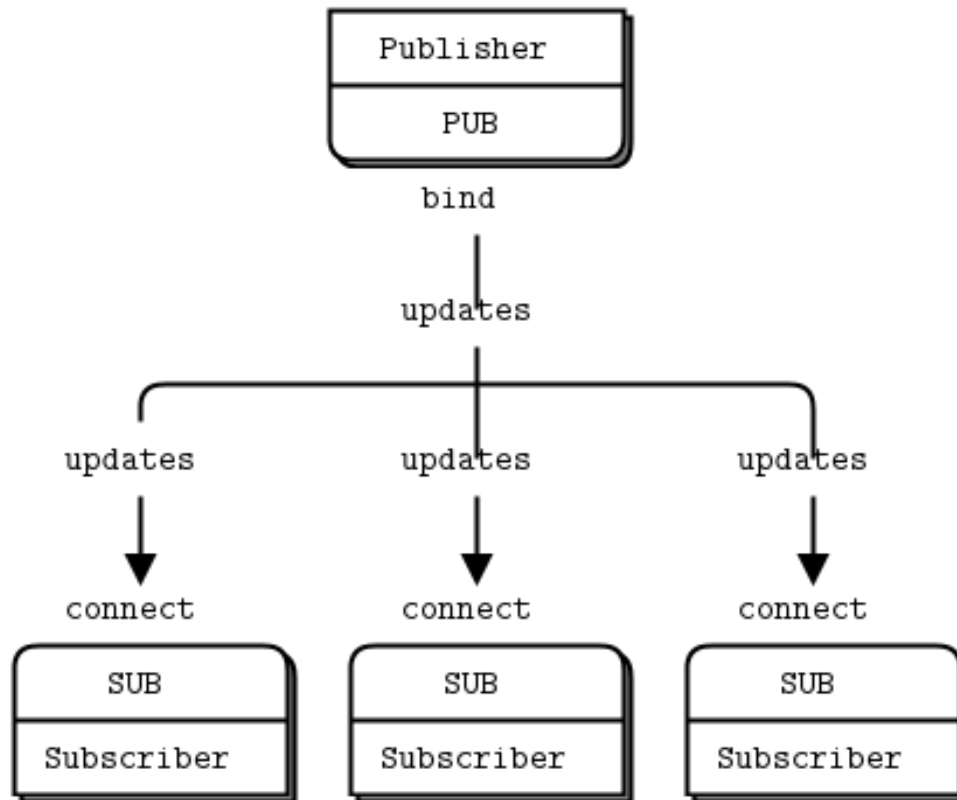
Patterns

- <https://github.com/drodri/zmq-examples>

REQ-REP (RPC)

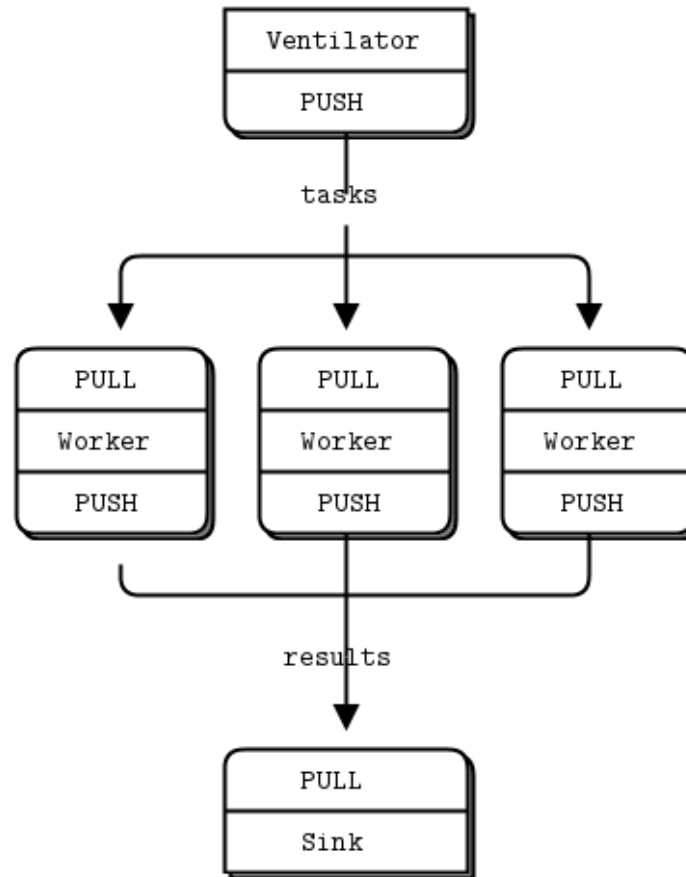


PUB-SUB

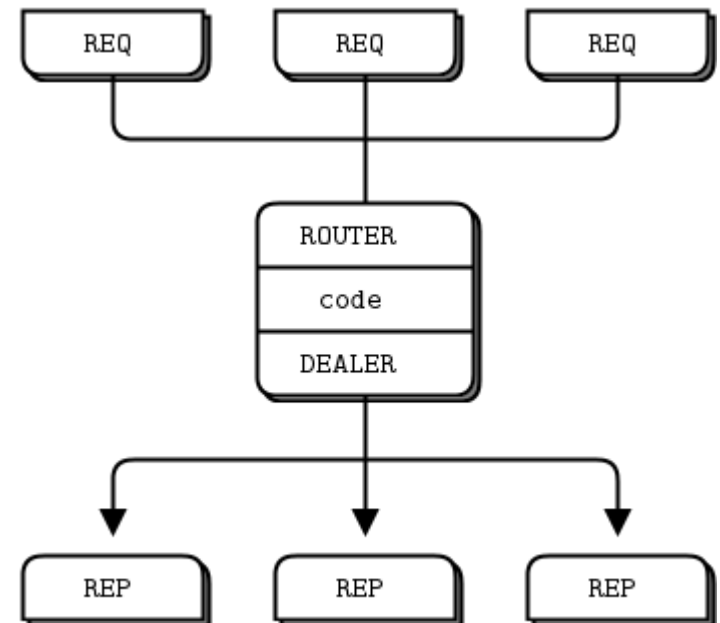
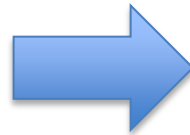
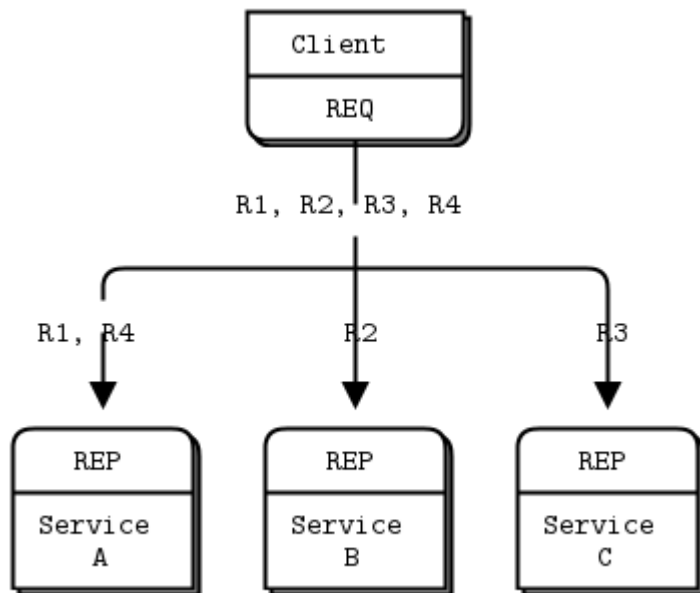
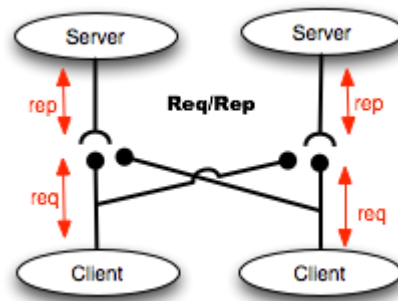


- Slow joiners => msgs lost
- Slow subs => msgs queue in server

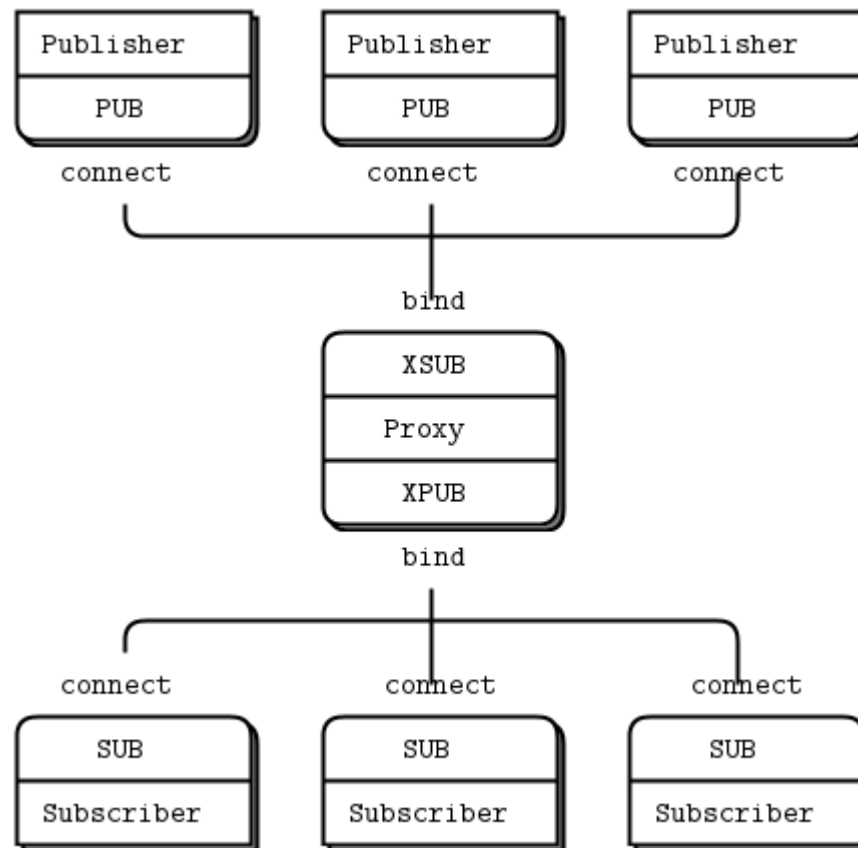
PUSH-PULL



REQ-REP with broker



PUB-SUB with Proxy





CONAN

C/C++ package manager

<https://conan.io>
@conan_io
info@conan.io