`bullhorn` Design

`bullhorn` contains program pairs, or links, for networked communication. Included methods are `broadcast`, `listen`, and `pubsub`.

All input is expected to be base-16 bytes and all output is base-16 bytes. This is converted to actual bytes before being sent over the network. Output is converted back to base-16 bytes.

Different links have different metadata.

`broadcast`

`broadcast` messages to all clients.

This is done via the broadcast address.

The server will send all newline-separated lines it receives over STDIN to every client until STDIN is closed. The clients print all newline-separated lines they receive until they are terminated.

A 4 byte checksum is included before the message bytes as part of the metadata. Messages with invalid checksums are ignored.

`listen`

`listen` allows messages to be reliably sent from talkers to a listener.

This is done via TCP.

The clients will connect to the servers, write all their input from STDIN to the connections, and the server will echo the messages to STDOUT. Clients run until STDIN is closed or the connection is closed. The servers run until they're terminated.

A 4 byte checksum is included before the message bytes as part of the metadata. Messages with invalid checksums are ignored.

`pubsub`

`pubsub` allows messages to be sent from publishers to subscribers.

This is done via a pub/sub system which operates over UDP with a TCP trunk. The TCP trunk allows the publisher to know when to stop publishing to subscribers and lets the subscriber know when it needs to try to reconnect to a publisher if reconnect is enabled. The unreliable UDP connection is fine because mostly periodic statuses are sent through the system.
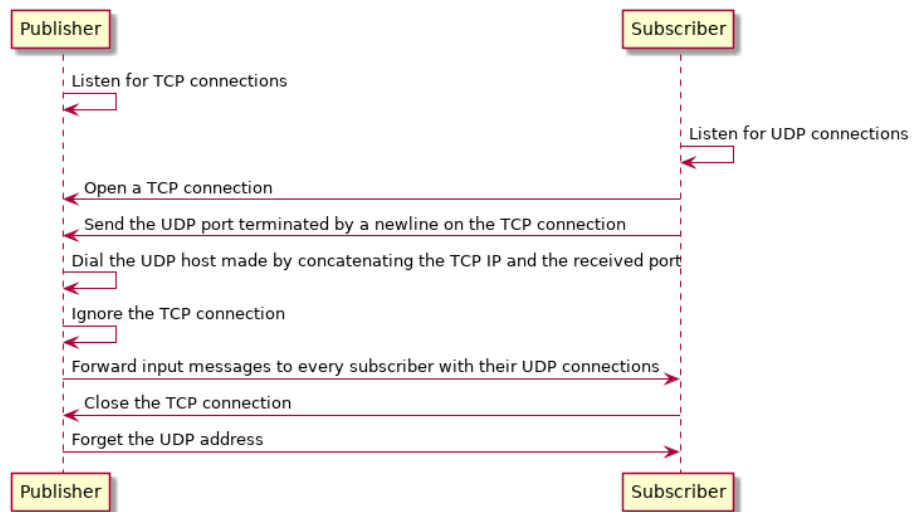
Figure 1: Sequence Diagram

The publisher will publish all newline-separated lines it receives over STDIN to every subscriber until STDIN is closed.

The subscribers print all newline-separated lines they receive from the publisher until the publisher is closed if reconnect isn't enabled. Subscribers never close if reconnect is enabled and will just periodically attempt reconnects. Subscribers will always exit with a failure to connect unless terminated because they will either try to reconnect forever or fail to connect to a terminated publisher.

A 4 byte checksum is included before the message bytes as part of the metadata. Messages with invalid checksums are ignored.