



# Telepathy

Breaking the Silence: Making Applications Talk with Telepathy





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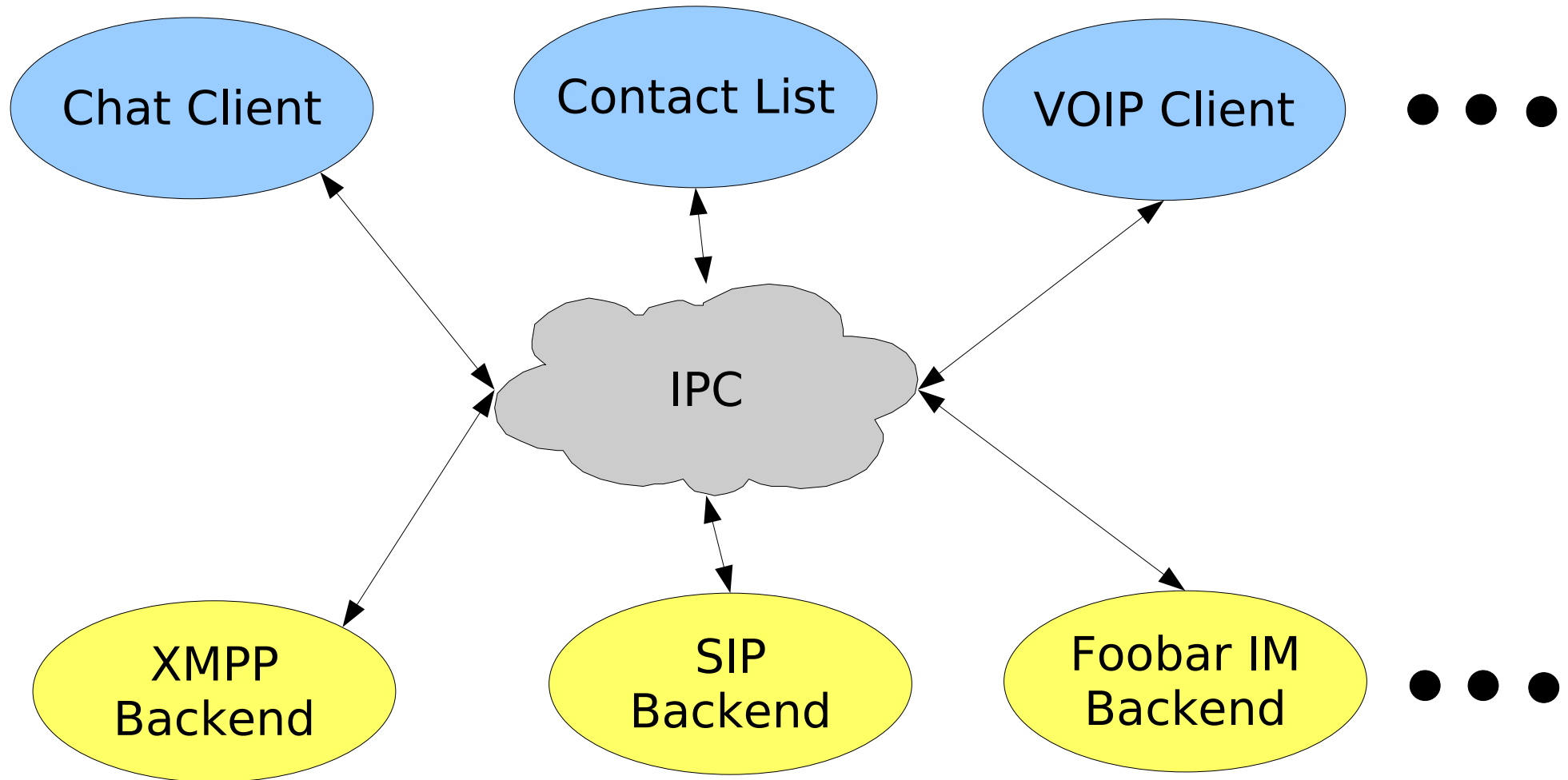
# About Me

- Debian developer (ish)
- Former Pidgin “crazy patch writer”
- One of the directors of Collabora Ltd
- Lead architect/developer/herder of the Telepathy project

# Telepathy: Overview

- D-Bus API for abstracting real-time communications protocols
- Backend “connection managers” connect to the server and speak the protocol
- Clients use the standard API to access presence, messaging, and more...

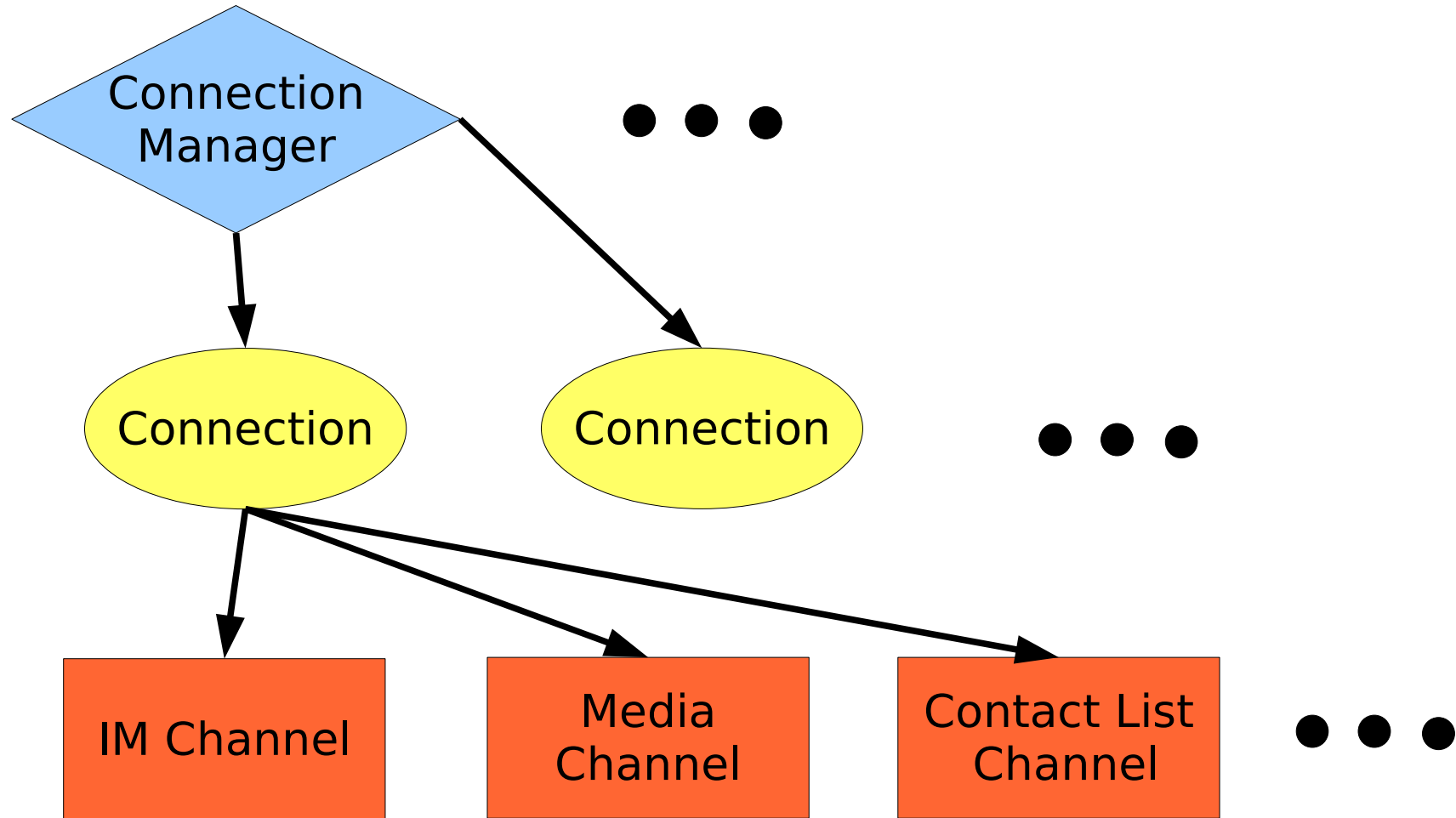
# Telepathy: Overview



# Telepathy: Benefits

- ✓ Do one thing and do it well
- ✓ Re-usable components
- ✓ Protocol-independent user interfaces
- ✓ Share connections between client programs
- ✓ Language (and license) independence
- ✓ Enables desktop integration

# Telepathy: Concepts



# Telepathy: Concepts

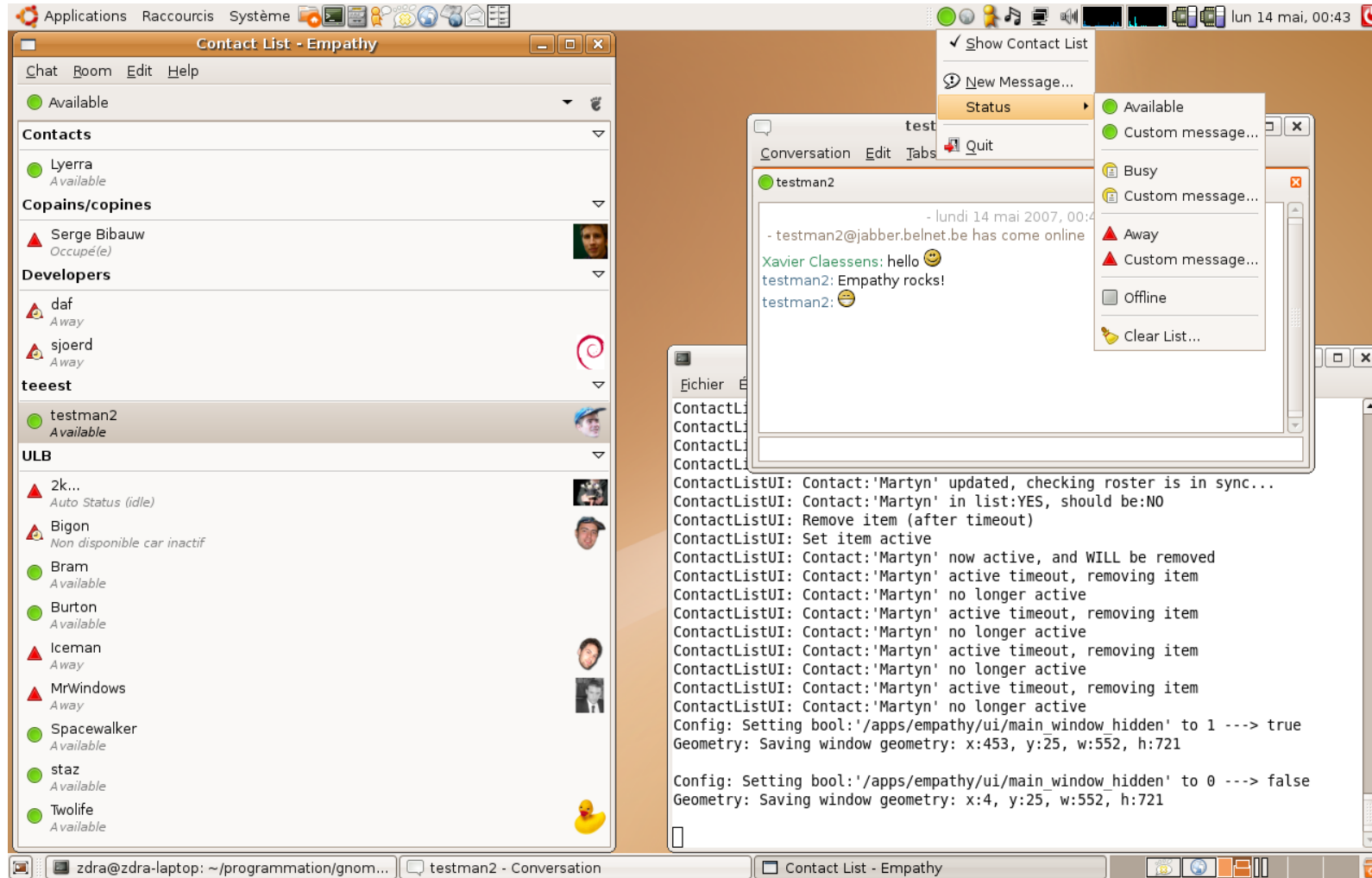
- Contacts on a connection are identified by integer “handles”, as well as rooms, contact lists, etc
- Channels are usually associated with a certain handle
- Latest specification is always available at <http://telepathy.freedesktop.org/spec.html>



# Telepathy: Backends

- Gabble (XMPP)
- Salut (Link-Local XMPP, aka Bonjour)
- Sofia-Sip (SIP)
- Butterfly (MSN)
- Idle (IRC)
- Haze (libpurple-based, so AIM, ICQ, Yahoo, Bonghits, Misc, Other...)

# Users: GUI (Empathy)



# Users: CLI (Fama)

```
mario@rex: ~/projects/fama-shoot
File Edit View Terminal Tabs Help

mario@rex: ~/projects/fama-shoot
mario@rex: ~/projects/fama-shoot

F A M A I M

robert.mcqueen@collabora.co.uk

[13:01] mario.danic@gmail.com
Hello LUG Radio Live!
[13:01] mario.danic@gmail.com
http://fama-im.org
[13:01] robert.mcqueen@collabora.co.uk
hey, this CLI client is cool... I can mention
it in my talk :)

Contacts
mario.danic@gmail.com
Ivica
Alen Pekic
Dzi Web
Ivica Munitic
Josip Lisec
Kálmán Kémenczy
Miguel de Icaza
Nacho Martin
Static
Xavier Claessens
Robert McQueen
sloevenh1
squall38
Alejandro Sanchez Acosta
Adam Olsen
Domagoj Zecevic
Filip Radelic
Mislav Covran
Tejus AG

[13:02] Act: []
>
```

# Users: Nokia N810



- Uses Telepathy for XMPP and SIP out of the box
- Nokia's own UI for chat and audio/video calls
- You can install IRC, link-local XMPP, MSN, AIM, etc...

# Users: OLPC

- Uses Telepathy backends to support both XMPP and link-local XMPP (Bonjour)
- Uses Tubes for Activity sharing
- More on that story later...



# Tubes: Overview

- Telepathy channel type for applications to exchange arbitrary data
- Support for exporting existing stream services through stream tubes
- Export D-Bus objects to your contacts with D-Tubes
- Implemented on XMPP and link-local XMPP (with multicast)

# Tubes: Benefits

- ✓ Connection manager takes care of networking details - NAT traversal, multicast, server relaying...
- ✓ Interact with your existing contacts
- ✓ Do multi-user collaboration without a special server (particularly with D-Tubes)
- ✓ Avoid doing your own marshalling by using D-Tubes

# Tubes: API

- Request a `org.freedesktop.Telepathy.Channel.Type.Tubes` channel with a contact or a room, or get notified by a `NewChannel` signal
- Use `ListTubes` to see what tubes are available
- New tubes emit the `NewTube` signal
- Request and accept tubes with methods depending on the type...



# Tubes: API

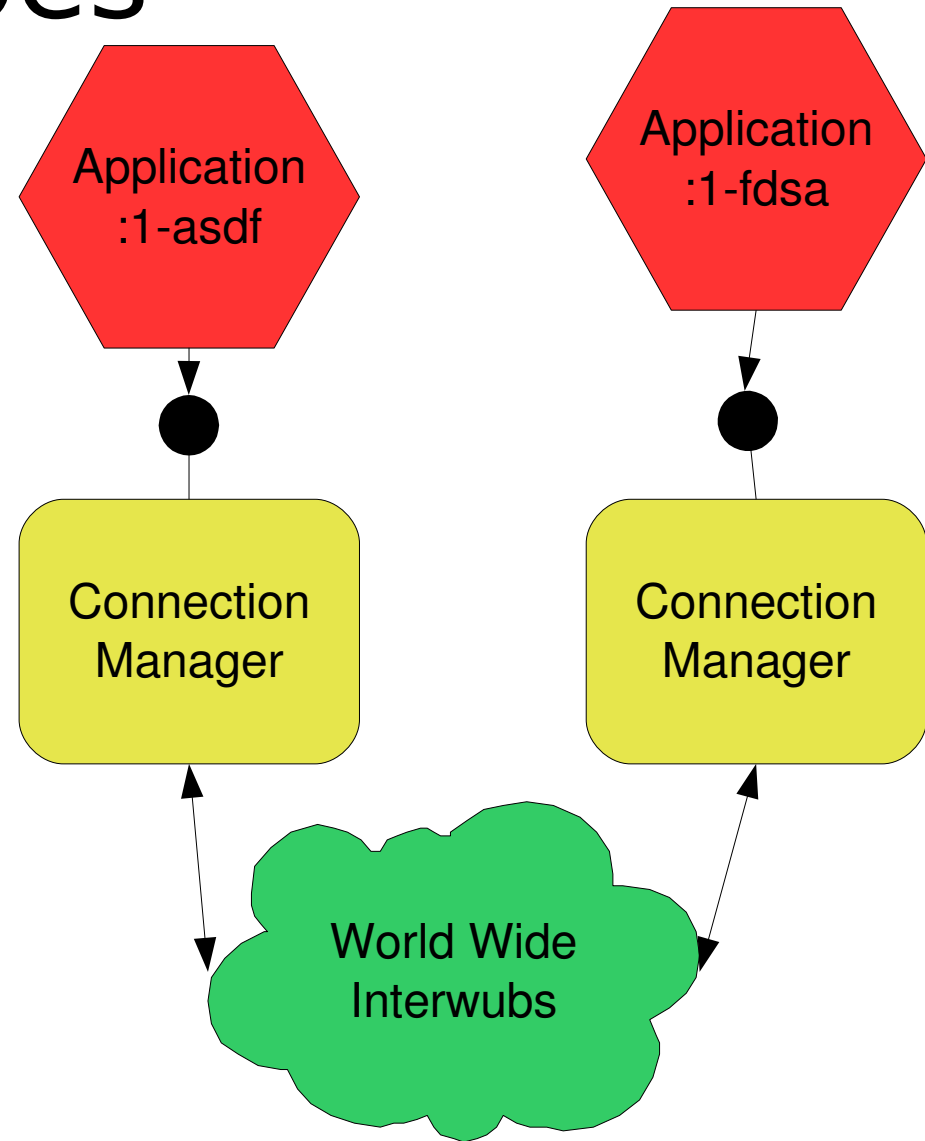
- TubeStateChanged signal, states are: pending local approval, pending remote approval, open
- Socket socket address types: IPv4, IPv6, Unix, D-Bus
- Socket access controls: localhost, same user, certain host or network

# Stream Tubes

- Export your service's socket with OfferStreamTube
- Accept an incoming offer with AcceptStreamTube
- Once it's open, get the local address with GetStreamTubeSocketAddress

# D-Tubes

- Connection manager simulates the bus daemon
- Every client is a bus endpoint
- Unique names are allocated



# D-Tubes

- Open the tube with OfferDBusTube
- Accept an offer with AcceptDBusTube
- Get the D-Bus socket with GetDBusTubeAddress
- Connect to the socket with your D-Bus bindings
- Export objects, emit signals, call methods as usual

# Implementation: Gabble

- XMPP backend
- Opens peer to peer tubes with XMPP Stream Initiation
- Multi-user tubes are layered on top of XMPP Multi-User Chat rooms
- Currently everything goes through the server as base64, but direct connections are coming soon

# Implementation: Salut

- Link-local XMPP (Bonjour) backend
- Opens peer to peer tubes with direct TCP connections, which is how messages are usually exchanged
- Multi-user tubes are layered on top of the Clique reliable multicast protocol, which is how multi-user chat is implemented

# Clique (Reliable Multicast)

- Invites to multicast address:port are sent through the direct connections
- Participants send heartbeats to manage membership
- Missed messages are re-transmitted with negative acknowledgements
- Causal ordering is guaranteed using per-sender message counters

# Python API

- Telepathy-python provides constants and some thin wrappers
- The interfaces belonging to Connections and Channels are automatically discovered for you
- Most methods and signals are just accessed through the D-Bus bindings



# Python Example

- Derived from the examples in telepathy-python
- Exports a VNC service on localhost to the given contact
- Lets see if it works...

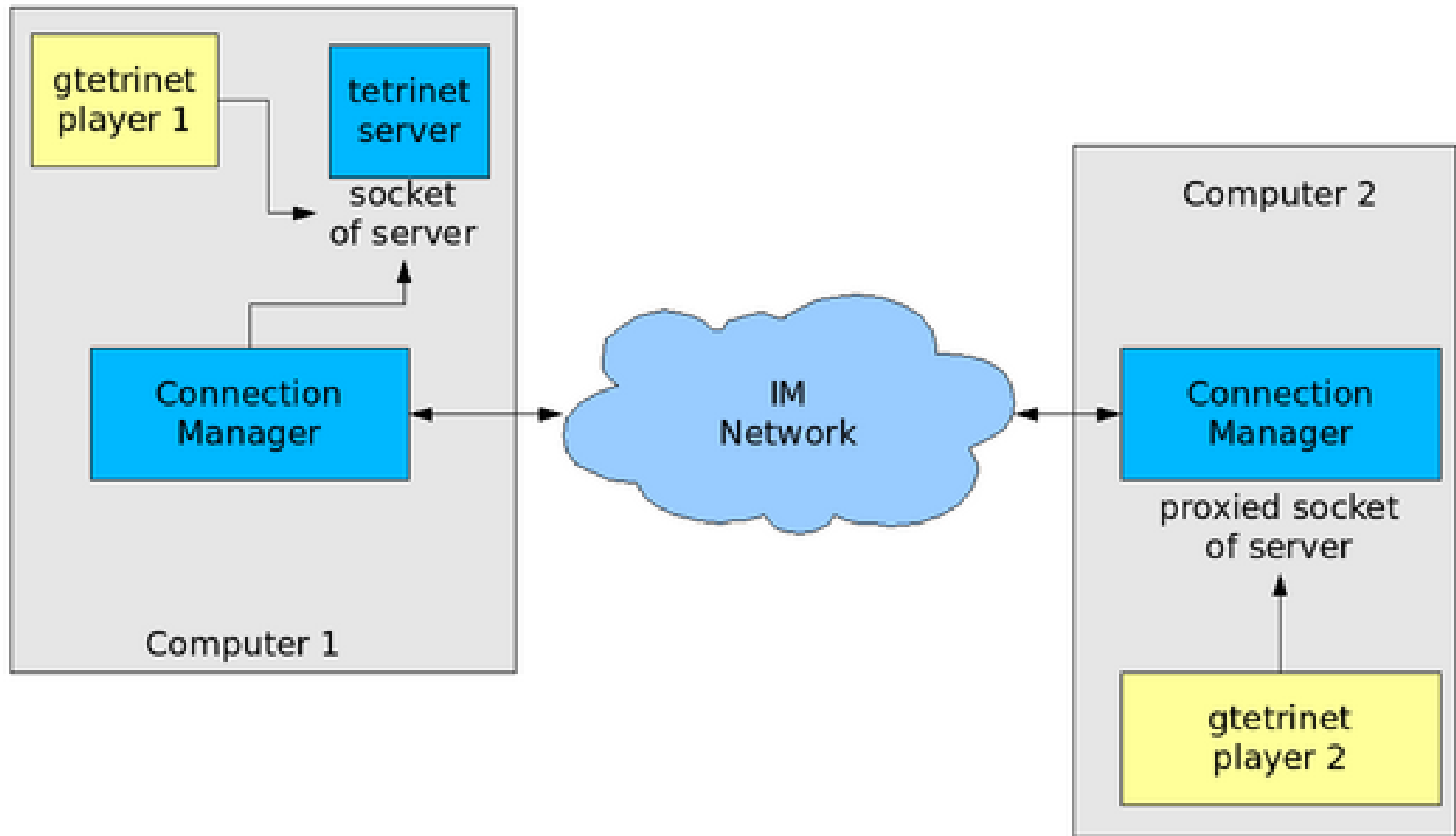
# Glib API

- Telepathy-glib 0.7.1 (any day now :D) has an auto-generated client API to hide much of the pain of using dbus-glib directly
- Methods can be called asynchronously, or enter the mainloop waiting for a reply
- Will probably push this kind of API down into dbus-glib

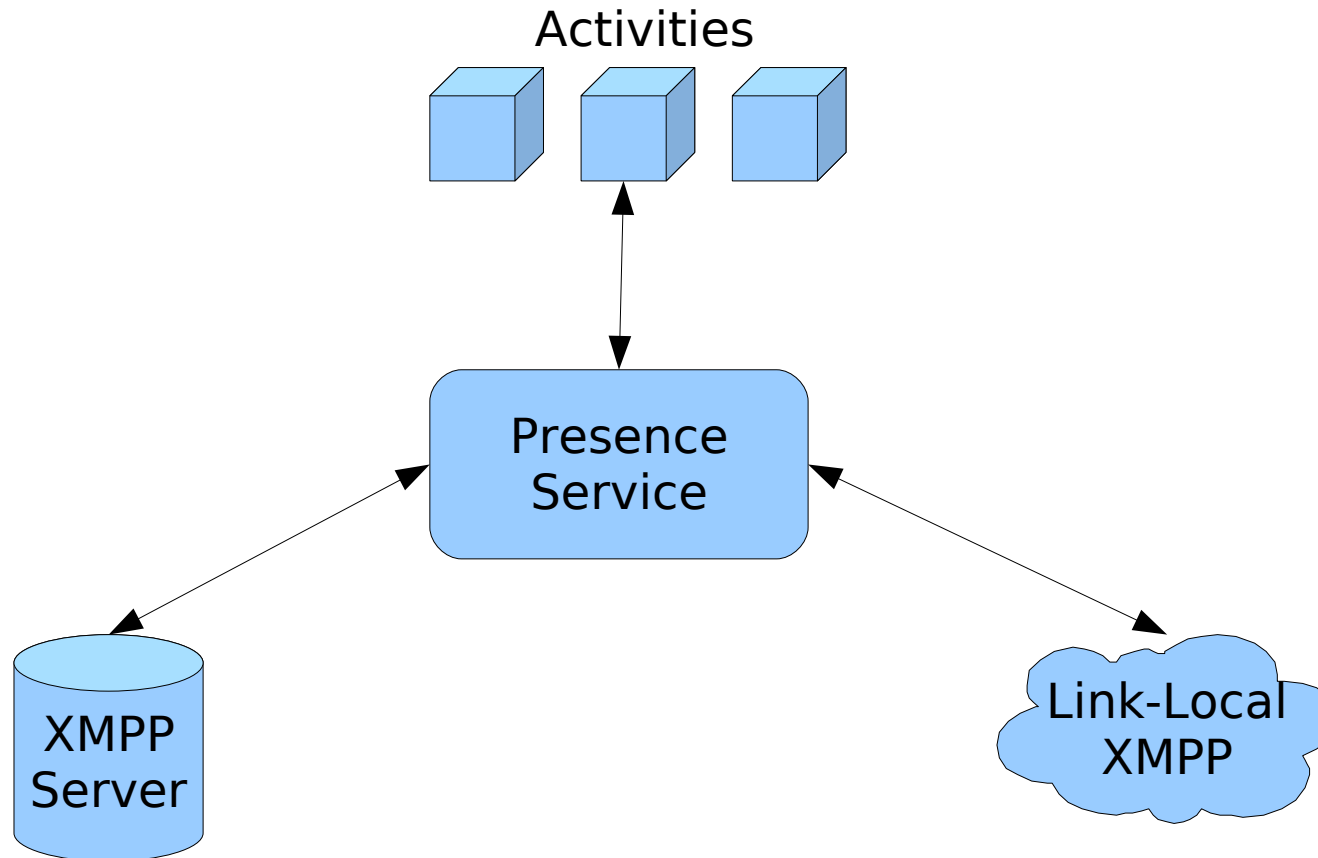
# Gtetrinet Demo

- From Guillaume's blog (see <http://cass.no-ip.com/~cassidy/blog/>)
- Thanks also to Alban Crequy
- Patch to Gtetrinet adds a contact chooser and offer the server via stream tubes
- Patch to Empathy adds a “channel handler” for incoming Tubes channels

# Gtetrinet Telepathy model with server



# One Laptop Per Child



# OLPC Demo

- And then there will be cake..

# The Chicken and The Egg

- There's little incentive to integrate applications to Telepathy unless developers use Telepathy for their IM/presence/etc
- Unless applications use it to offer extra features, there's little incentive to use Telepathy instead of another IM client
- Help us by make Empathy better so people can switch, or hook up your app...

# Future Work

- Datagram tubes, for real-time and existing UDP apps (OpenVPN over Tubes...? :D)
- Use libnice to do NAT traversal
- Better Telepathy spec coverage (capabilities, Mission Control for account management)
- Your awesome applications!



# Acknowledgments

- Thanks to Mads. Chr. Olesen for the initial tubes Summer of Code project
- Thanks to Sjoerd Simons for his awesome work on Salut and Clique
- Thanks to Guillaume Desmottes for implementing tubes everywhere
- Thanks to Simon McVittie for the code review and spec wrangling

# Big up the Telepathy massive!

- Wiki: <http://telepathy.freedesktop.org/>
- IRC channel: irc.freenode.net #telepathy
- Mailing list:  
[telepathy@lists.freedesktop.org](mailto:telepathy@lists.freedesktop.org)