Free (as in freedom) communications, VoIP and messaging

Making a genuinely free alternative to Skype/Lync/Viber

Daniel Pocock daniel@pocock.com.au

http://www.OpenTelecoms.org

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Outline

Mail server deployment
Why SMTP took hold

- *Mail servers* are installed by default
- *Trivial effort* is necessary to operate full Internet email: just an MX record and a couple of lines of config enables mail for all UNIX users on a host
- *VoIP servers* have not been deployed by default by any major distribution.
- *Free software and open standards* for VoIP have not become entrenched in the same way as SMTP, POP3, IMAP

VoIP punished
Why VoIP has been held back

- *Asterisk* and similar products require much more setup effort
- *UNIX users* don't automatically become VoIP users
- *Holding on to phone numbers* and other traditions has muddied the waters: SMTP never attempted to replicate street addresses or fax numbers. Legacy telephone handsets are still pervasive.
- *Two protocols*, SIP and Jabber, to choose from
- *NAT incompatibilites* have undermined reliability and confidence

Weeds grow in the cracks
Failure to deploy VoIP left gates open for non-free solutions

- *Skype and Viber* have seized the consumer VoIP market
- *Microsoft Lync* gaining traction in the corporate world
- *Facebook's* recent attack on email addresses does not leave me feeling enthusiastic about their coming VoIP service

How bad could it get?
The risk if action is not taken

- *Real-world examples* in other technologies should be a wake-up call
- *DVD CSS and DRM* has locked people out of their own DVD hardware
- *HDMI DRM* has extended the concept across the home entertainment domain
- *UEFI Secure Boot* is about to take hold of the PC
- *What next?* Will Skype and Microsoft Lync operate as a closed system with similar DRM-like attributes?

VoIP and DRM
The nightmare scenario

- *Consumers* will have two choices when calling a corporate: use a legacy phone (with call charges), or use Skype
- *DRM-like* mechanisms may prevent third-party software operating on the network
- *Advertising* will not be in-your-face — techniques like voice-analysis will provide feedback to advertising networks via the Microsoft Passport profile. Targetted banner-ads may appear 'by co-incidence' later in the day.
- *Corporates* will be able to pay a fee to ensure their callers are not subjected to immediate advertising
- *Calls between Corporates* may not work easily without Lync, punishing IT departments that don't go fully Microsoft

The nightmare scenario
Advertising feedback possibilities
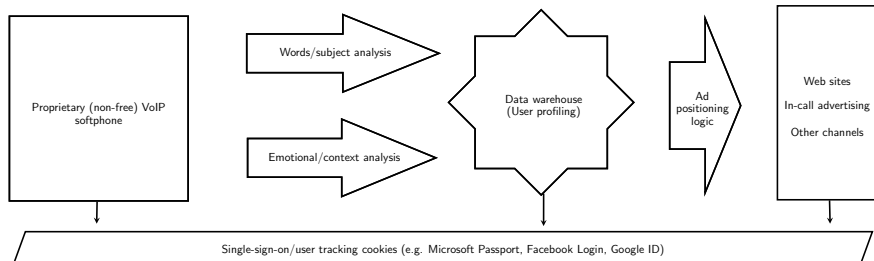
Peer pressure
Communications is a sore spot

- *Communications* is maybe the only pervasive technology that invokes more emotion than IT when users are dis-satisfied
- *Pressure* from personal and corporate peers is more intense due to the implicit need for interoperable solutions
- *A real danger* that users locked-in to the proprietary communications technology by their network of peers will be out-of-reach for free software like Debian
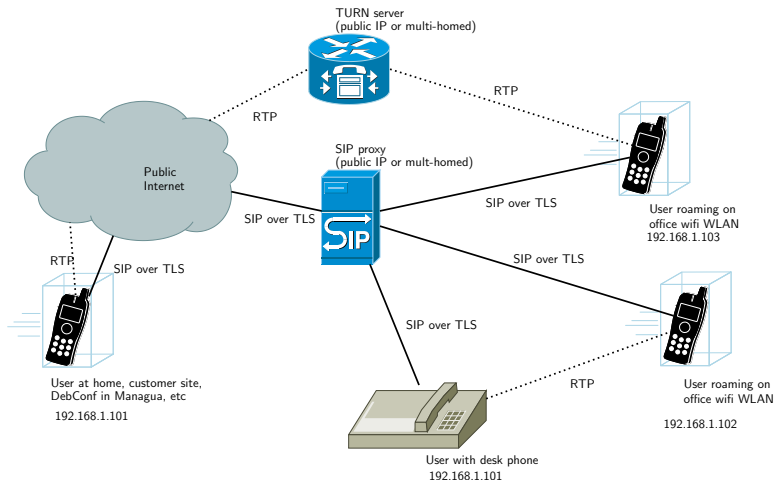
Deploying VoIP
Making it easier

- *Maximising success of every call*
    - *Both protocols* (SIP and Jabber) in parallel
    - *Multiple codecs* supporting lowest-common-denominator
- *Plug-and-play* solutions are important — `repro` and `ejabberd`
- *NAT headaches* must be addressed — ICE/TURN — `resiprocate-turn-server` on Debian (for both SIP and Jabber)
- *Phone spam* must be kept out — TLS — see OpenTelecoms.org TLS notes
- *Legacy* traditions like phone numbers can still be supported — ENUM — see `dlz-ldap-enum` for an instant solution
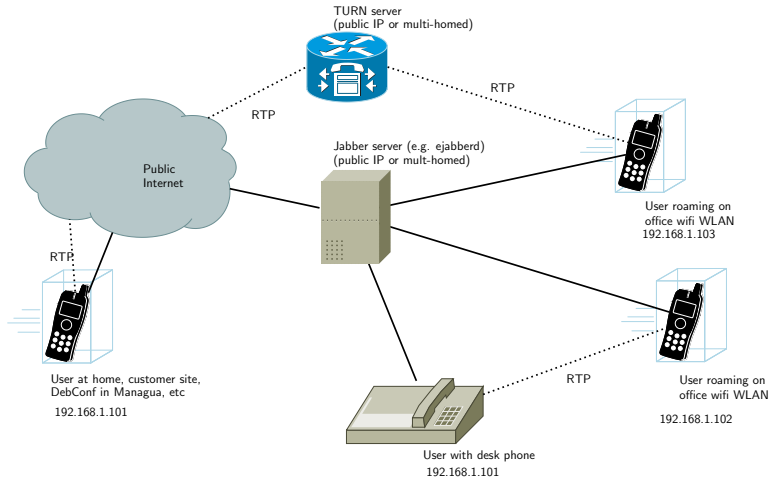
SIP deployment
Architecture diagram

TURN server
(public IP or multi-homed)

RTP

RTP

SIP proxy
(public IP or mult-homed)

SIP over TLS

SIP over TLS

User roaming on
office wifi WLAN
192.168.1.103

Public
Internet

SIP over TLS

SIP over TLS

RTP

SIP over TLS

User at home, customer site,
DebConf in Managua, etc

192.168.1.101

SIP over TLS

RTP

User roaming on
office wifi WLAN

192.168.1.102

User with desk phone
192.168.1.101

Jabber (XMPP) deployment
Architecture diagram

Combined SIP + Jabber deployment
Architecture diagram
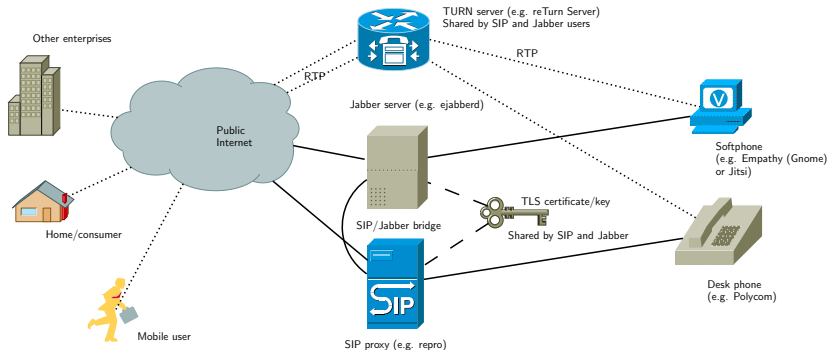
Conclusions
The risks should be clear

- *Genuinely Free software and genuinely Free communications* are interdependant and could succeed or fail together
- *Evidence* presented today shows that scary DRM-like things are real threats

Thinking inside-out
Must put federated VoIP first

- *Holding on to legacy concepts* like phone numbers has hamstringed VoIP
- *Many Asterisk installations* still use the phone number as the fundamental user identity
- *Lumicall* supports phone numbers with ENUM — but also attacks from the other flank, testing email addresses from the contact book, check for SRV records, offers pure-VoIP on every attempt to call
- *Thinking this way — Federation —* when designing or deploying any of Debian's great VoIP packages is the only way to seize the day

Lumicall example
Finding multiple routes

Listing 1: Find multiple routes (class HarvestDirector)

```
harvesters.add(new ENUMCandidateHarvester());
harvesters.add(new EmailCandidateHarvester());
harvesters.add(new SIPCarrierCandidateHarvester());
harvesters.add(new GSMCandidateHarvester());
CyclicBarrier b =
    new CyclicBarrier(harvesters.size() + 1);
Vector<HarvestThread> v =
    new Vector<HarvestThread>();
for(DialCandidateHarvester h : harvesters) {
    HarvestThread t =
        new HarvestThread(b, h, context, number, e164Number);
    v.add(t);
    t.start();
}
```

More information
Useful web sites

- http://wiki.debian.org/UnifiedCommunications
- http://www.OpenTelecoms.org
- http://www.reSIProcate.org
- http://www.lumicall.org