

fwdOUT

Architecture & Implementation

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Outline

- ◀ Relationship to other pulver.com activities
- ◀ Problem
- ◀ Implementation
 - Design Architecture
 - Node Configuration
 - Selection algorithm
 - Hunting algorithm
 - Charging procedure
- ◀ Issues and Discoveries
- ◀ Results and Statistics

Some Open Pulver Community activities

- ▶ Free World Dialup
- ▶ IAX/Free World Dialup
- ▶ SIP.edu ENUM Exchange
- ▶ FwdOUT a.k.a. “forward OUT”

Problem Statement

◀ *“May I borrow your phone? I’m in Australia and I need to call somebody in your town. If you let me, I’ll just reach across the Internet and place my call.”*

◀ *Creed*

- *The love you take is equal to the love you make.*
- *Build it and they will come*

◀ Provide Line Sharing – The original FWD vision

- Limit traffic
- Ensure fairness
- Handle Bad Routes
- Time Limit calls

◀ Low support overhead

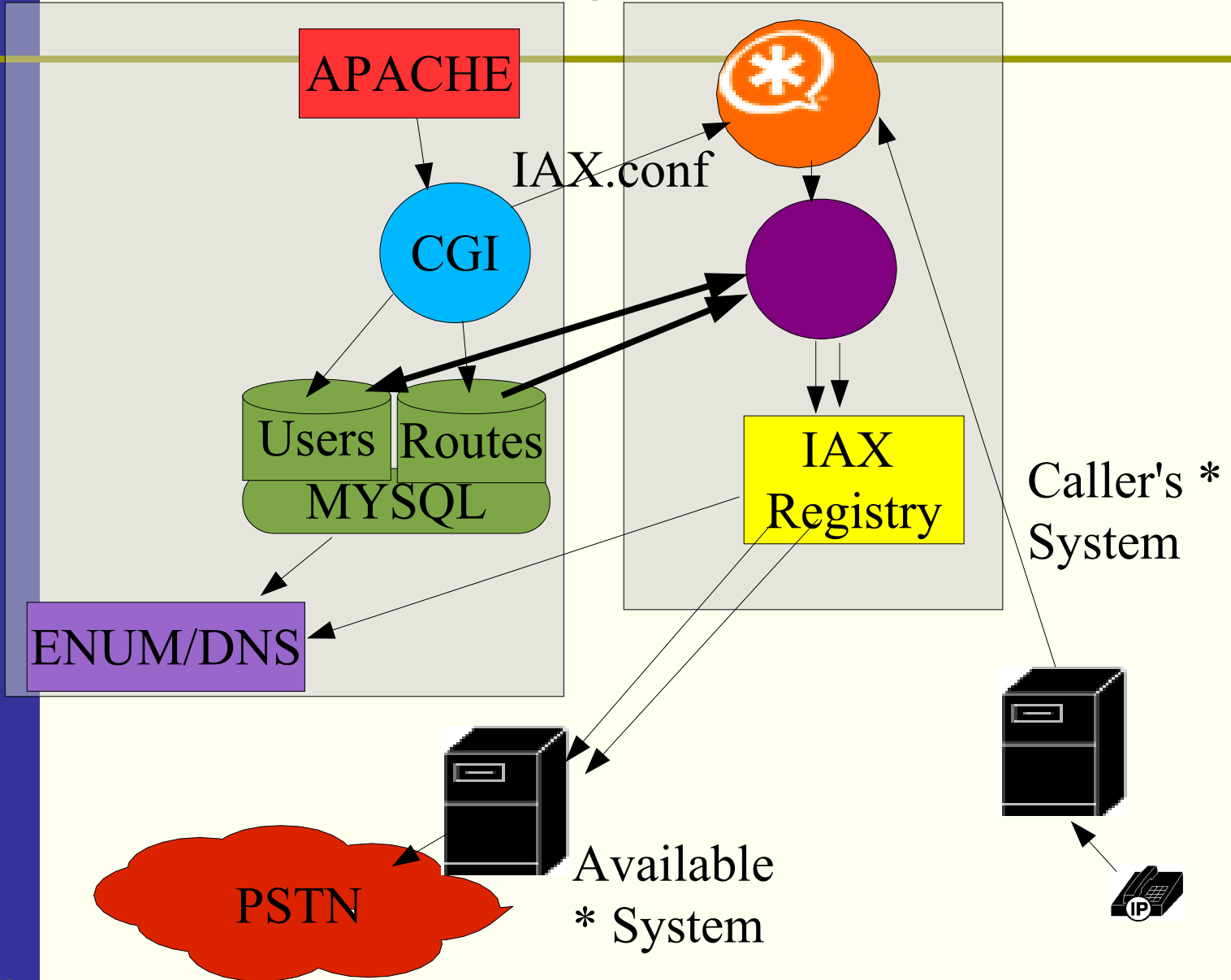
◀ Avoid Legal issues

◀ Disrupt Enlighten & Discover

The Realization

- ◀ *Ensuring Fairness through a system of credits is a lot like a pre-paid calling card application with a 'custom' way of buying cards.*
- ◀ *Mark already provided the foundation: **astcc.agi***

Design Architecture



Node Configuration

▶ */etc/asterisk/iax.conf:*

register => ACCOUNT:PASS@iax.fwdOUT.net
allow=ulaw
allow=gsm

▶

[fwdOUT]
type=friend
username=ACCOUNT
secret=PASS
host=iax.fwdOUT.net
context=fromfwdOUT
auth=rsa
inkeys=freeworlddialup

Node Configuration (2)

◀ Extensions.conf:

```
◀ exten => _394.,1,SetCallerId,  
◀ exten => _394.,2,Dial(IAX2/ACCOUNTID:PASSWORD@fwdOUT/${EXTEN:3},60,r)  
◀ exten => _394.,3,Congestion
```

```
◀ [fromfwdOUT] ;match the context in iax.conf
```

```
◀ ; make sure we only accept local calls, limit to 30 minutes
```

```
◀ exten => _1973437XXXX,1,Dial(ZAP/1/${EXTEN},60,T,L(1800000:1790000))
```

```
◀ exten => _1973635XXXX,1,Dial(ZAP/1/${EXTEN},60,T,L(1800000:1790000))
```

```
◀ exten => _1973457XXXX,1,Dial(ZAP/1/${EXTEN},60,T,L(1800000:1790000))
```

```
◀ ; watch out for 900, 976, and Bahamas#
```

```
◀ include => fromfwdOUT-catchall
```

```
◀ [fromfwdOUT-catchall]
```

```
◀ exten => _.,1,Congestion
```

```
◀ exten => h,1,Hangup ;hangup event
```

```
◀ exten => i,1,Hangup ;invalid event
```

```
◀ exten => t,1,Hangup ;timeout event
```

Implementation

◀ Asterisk

- IAX
- AGI: Perl / mysql

◀ Apache

- CGI
 - ▶ Account maintenance
 - ▶ Regenerate iax.conf
- Twiki

◀ Cron

- Distribute hourly credits
- Refill available routes

◀ ENUM

◀ DUNDI

- dundi-test

Extensions.conf

◀ [fwdv4]

```
; block really bad number here:  
exten => _1900.,1,congestion  
include => fwdv4-main
```

◀ [fwdv4-main]

```
exten => _XXXX.,1,SetVar(quiet=0)  
exten => _XXXX.,2,NoOp(2=${EXTEN},${callerID})  
exten => _XXXX.,3,NoOp(3=${EXTEN},${callerID})  
exten => _XXXX.,4,NoOp(4=${EXTEN},${callerID})  
  
exten => _qXXXX.,1,SetVar(quiet=8)  
exten => _qXXXX.,2,StripMSD(1)  
  
exten => _ZXXX.,5,DeadAGI(/home/fwdv4/agi/fwdv4.agi,${CHANNEL},${EXTEN},${quiet})  
  
exten => _XXXX.,6,NoOp(${DIALSTATUS})  
exten => _XXXX.,7,gotoif(${DIALSTATUS} != 'CHANUNAVAIL'? :10)  
exten => _XXXX.,8,gotoif(${DIALSTATUS} != 'CONGESTION'? :10)  
exten => _XXXX.,9,Hangup  
exten => _XXXX.,10,NoOp("Step 10 $status")  
exten => _XXXX.,11,GoTo(fwdv4-dundi,${EXTEN},1)  
exten => _XXXX.,12,Hangup
```

Balancing Algorithm

◀ The Query:

- `SELECT * FROM routes WHERE " .
$dbh->quote($phoneno) . " RLIKE CONCAT('^',pattern)
AND callslefttoday > 0
ORDER BY LENGTH(pattern) DESC,
callslefttoday/callsperhour) DESC";`

Hunting Algorithm

```
◀ while (my $res = $sth->fetchrow_hashref) {
    $res = &trytrunk($tech, $path, $phoneno, $maxmins);
    if (!($res eq "NOANSWER") && !($res eq "CHANUNAVAIL") && !($res eq
"CONGESTION")) {
        # Ooh, something actually happend!
        if ($res eq "BUSY") {
            $res = &mystreamfile("fwdv4-isbusy");
            &savecdr($cardno, $callerid, $phoneno, $trunk, $res, 0, 0, 0, $route_id);
        } elsif ($res eq "CANCEL") {
            &savecdr($cardno, $callerid, $phoneno, $trunk, $res, 0, 0, 0, $route_id);|
        } elsif ($res eq "ANSWER") {
            print STDERR "res is $res, answered time is $answeredtime\n" if $debug;
            print STDERR "Total used is now $carddata->{used}\n" if $debug;
            &savecdr($cardno, $callerid, $phoneno, $trunk, $res,
                $answeredtime, 1,$callstart, $route_id);
            &savedata($carddata,$routeowner,$route_id,$answeredtime);
        }
        $sth->finish;
        exit(0);
    }
}
```

Charging Algorithm

```
◀ sub savedata() { #record charges and give credits
...
#lower the remaining calls on trunk
$dbh->do("UPDATE routes SET callslefttoday=callslefttoday-1 ,
        callsmade=callsmade+1 WHERE route_id=" . $dbh->quote($route_id));

if ($answeredtime < 60) # no charge and reduced credit
{
    # no charge on short calls
    $perCallCredit= $perCallCredit/10;
}
else
{
    $dbh->do("UPDATE cards SET used=used+$perCallCost,inuse="
        . $dbh->quote($cardinfo->{inuse}) . " WHERE number="
        . $dbh->quote($cardinfo->{number}));
}

#credit the route provider

$dbh->do("UPDATE cards SET facevalue=facevalue+$perCallCredit
        WHERE number=" . $dbh->quote($route_owner));
}
```

Issues & Discoveries

- ✦ Trademark – careful what you name things
- ✦ Surprise Bills
- ✦ Privacy concerns
- ✦ Route validation
 - Service Rules
- ✦ The Brian Capouch problem
- ✦ 911/112
- ✦ Vermont discovers 911 backup

Where can you call?

- 1 - North America
- 202 - Egypt
- 31 - Netherlands
- 32 - Belgium (p)
- 33 - France (p)
- 3491 - Spain, Madrid
- 353140707 - IE Dublin
- 37069811803 - Lithuanian
- 370800000 - Lithuania
- 39X - Italy(p)
- 44 - UK (p)
- 46 - Sweden
- 47 - Norway
- 48800 - Poland Toll Free
- 49 - Germany
- 52664 - Mexico (p)
- 5411 - Buenos Aires
- 54 - Argentina
- 5511 - Brazil San Paulo
- 5521 - Brazil - Rio
- 603 - Kaula Lampor
- 61 - Australia (p)
- 63 - Philippines
- 64 - New Zealand (p)
- 657 - singapore (mobile)
- 659 - singapore (mobile)
- 7095 - Moscow
- 75 - Russia
- 7812 - St Pete
- 852 - Hong Kong
- 86 - China

Statistics

- ◀ 2021 Members
- ◀ 2.7 Million available calls.
- ◀ 175 active nodes typical
 - 3846 of 5053 routes
- ◀ 200 call attempts per typical day
- ◀ 25% long duration...

More info

◀ www.fwdOUT.net