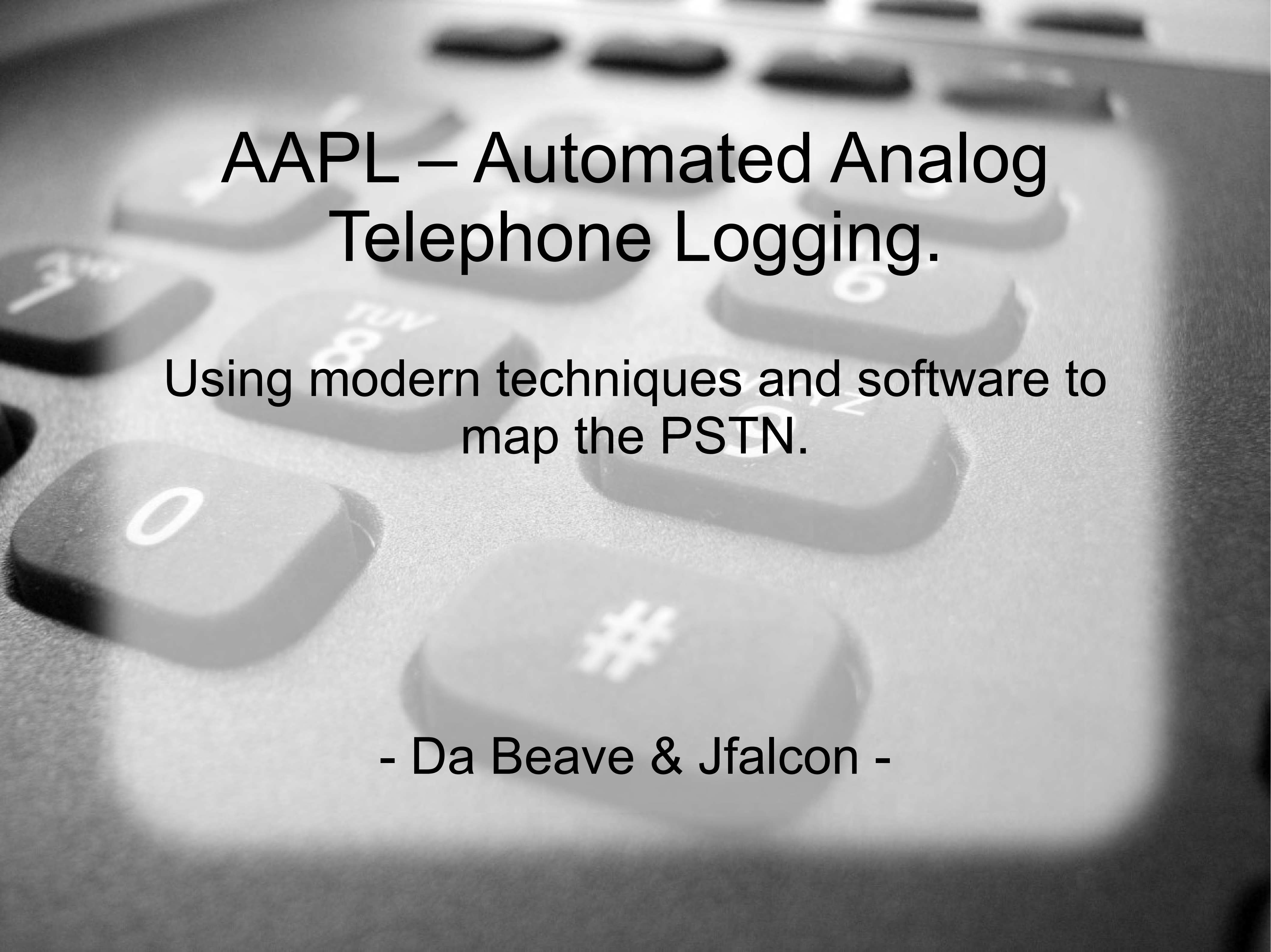


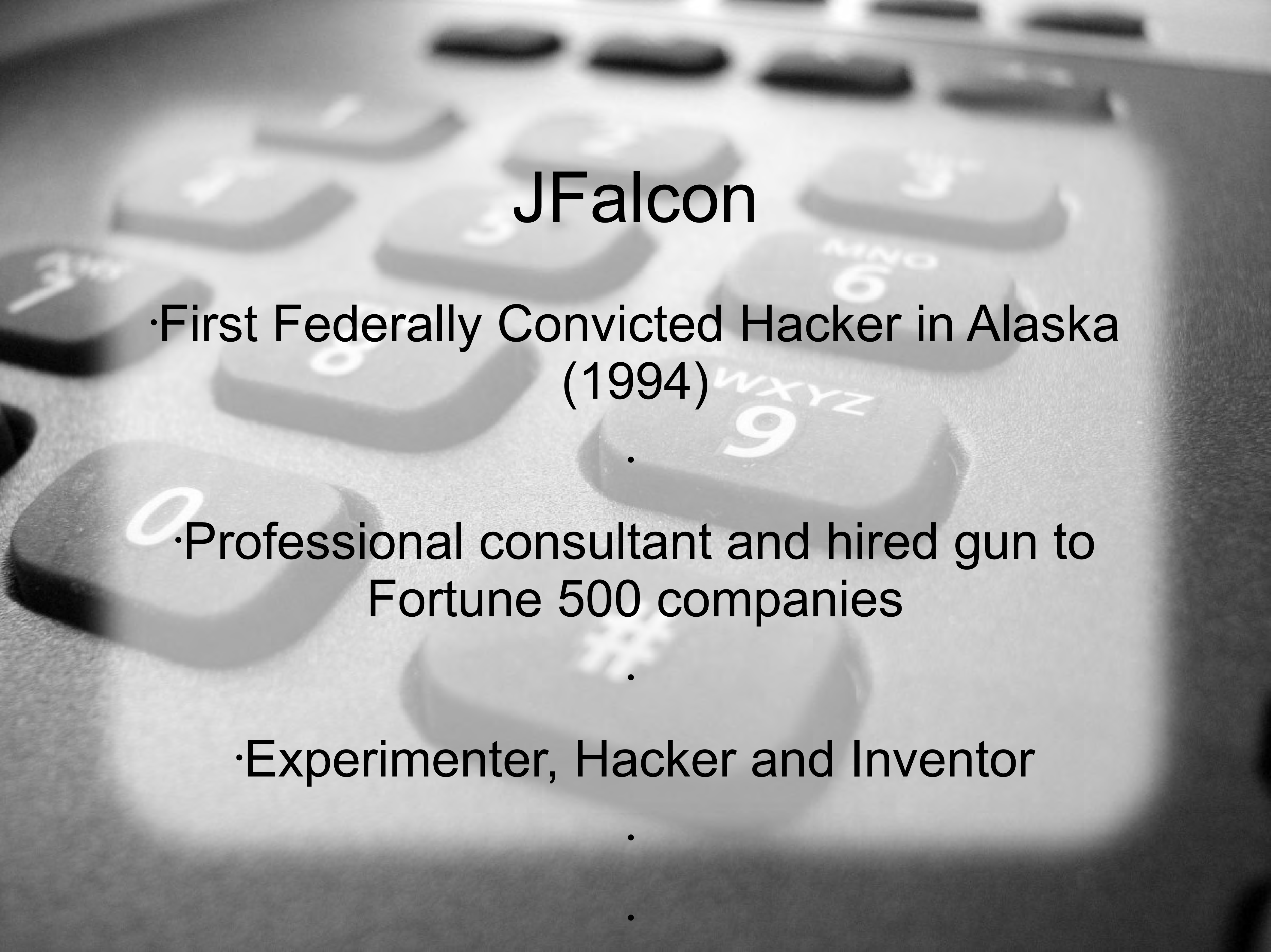
AAPL – Automated Analog Telephone Logging.

Using modern techniques and software to map the PSTN.

- Da Beave & Jfalcon -

Da Beave

- Work in the network security field @ Softwink, Inc.
- Author “Asterisk Hacking” and “Threat Analysis 2008” – Syngress Press
- Hacker/Programmer
- Author of iWar and various other “hacking” tools (X.25 tools, etc)
- Founder of 'Telephreak' (loose knit Asterisk/VoIP hackers).
- Check out www.telephreak.org (The BBS!)
- Founder of “The Deathrow OpenVMS cluster”



JFalcon

·First Federally Convicted Hacker in Alaska (1994)

·

·Professional consultant and hired gun to Fortune 500 companies

·

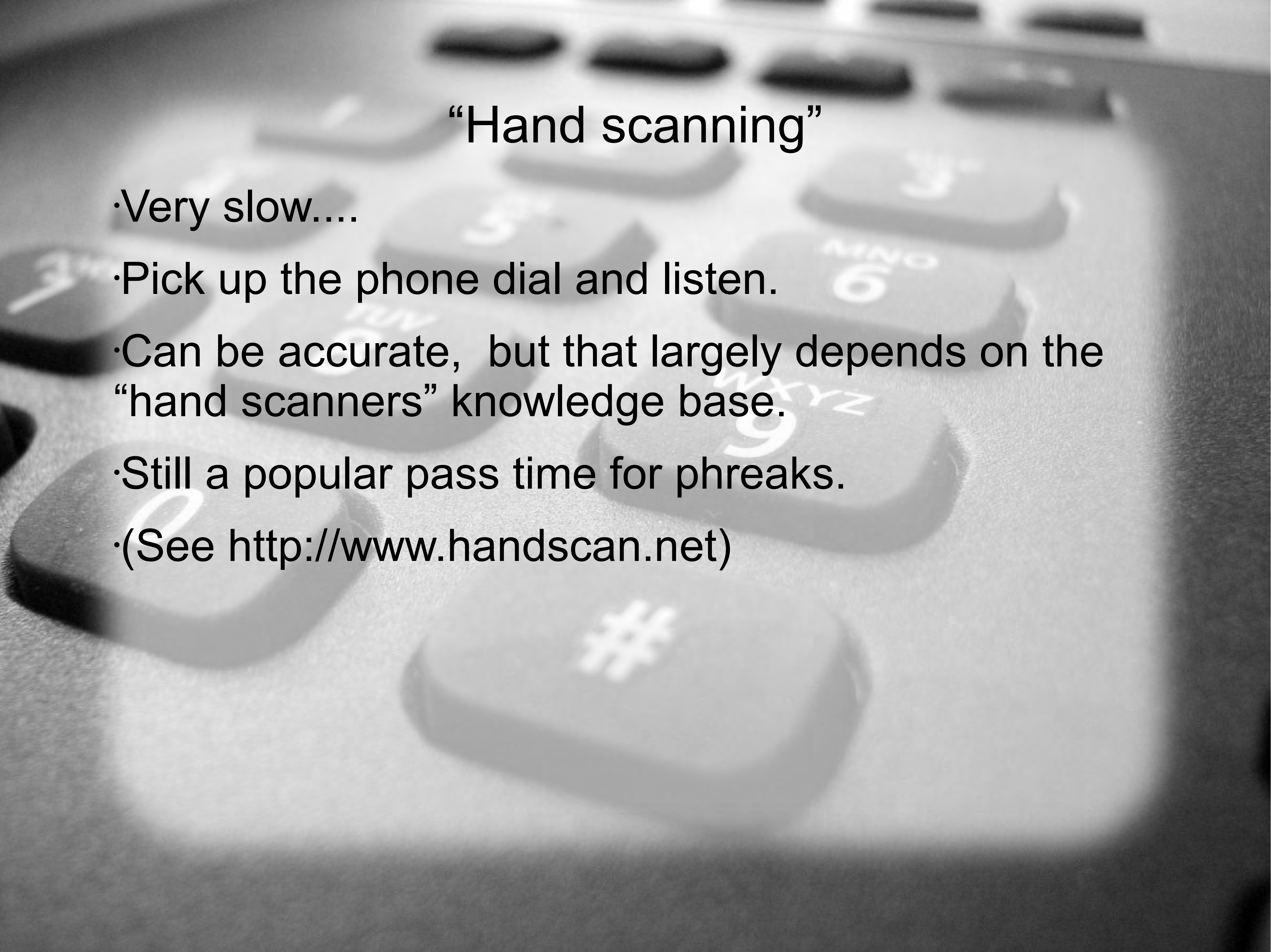
·Experimenter, Hacker and Inventor

·

·

Brief history....

Yes, we know who we're talking to......

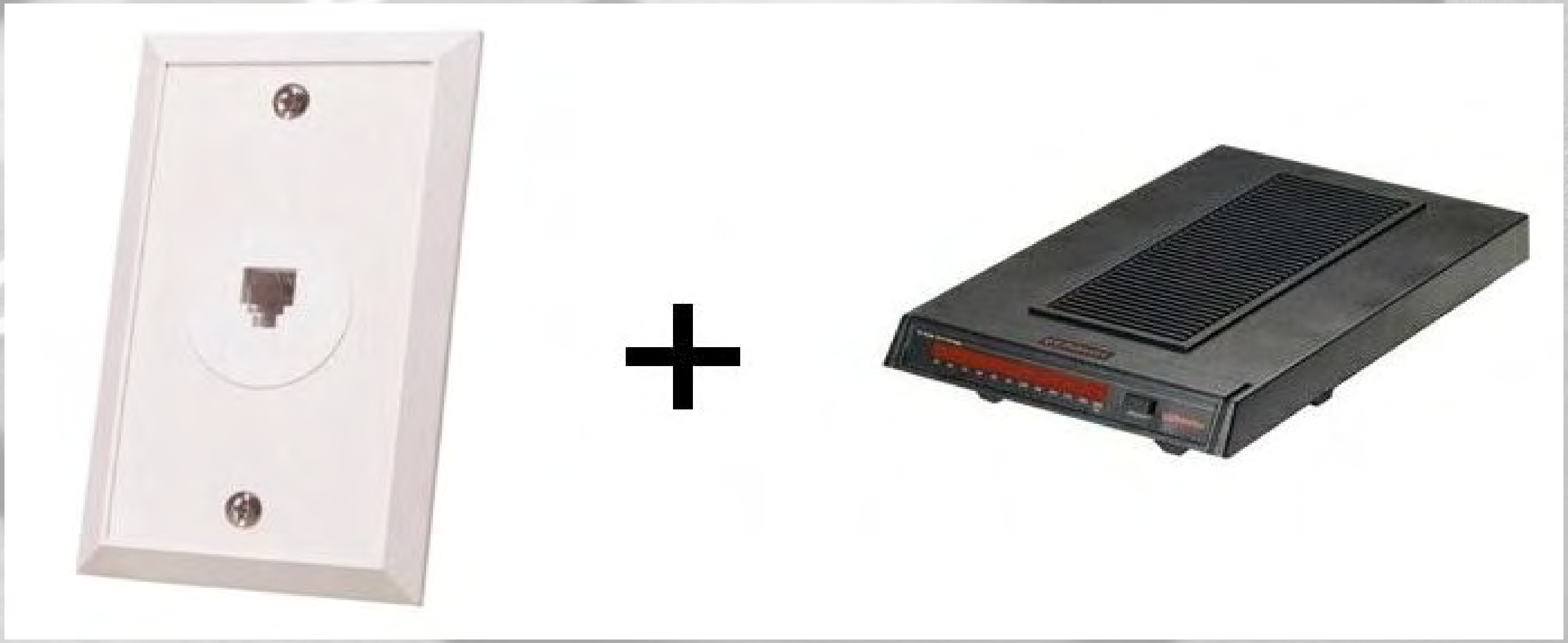


“Hand scanning”

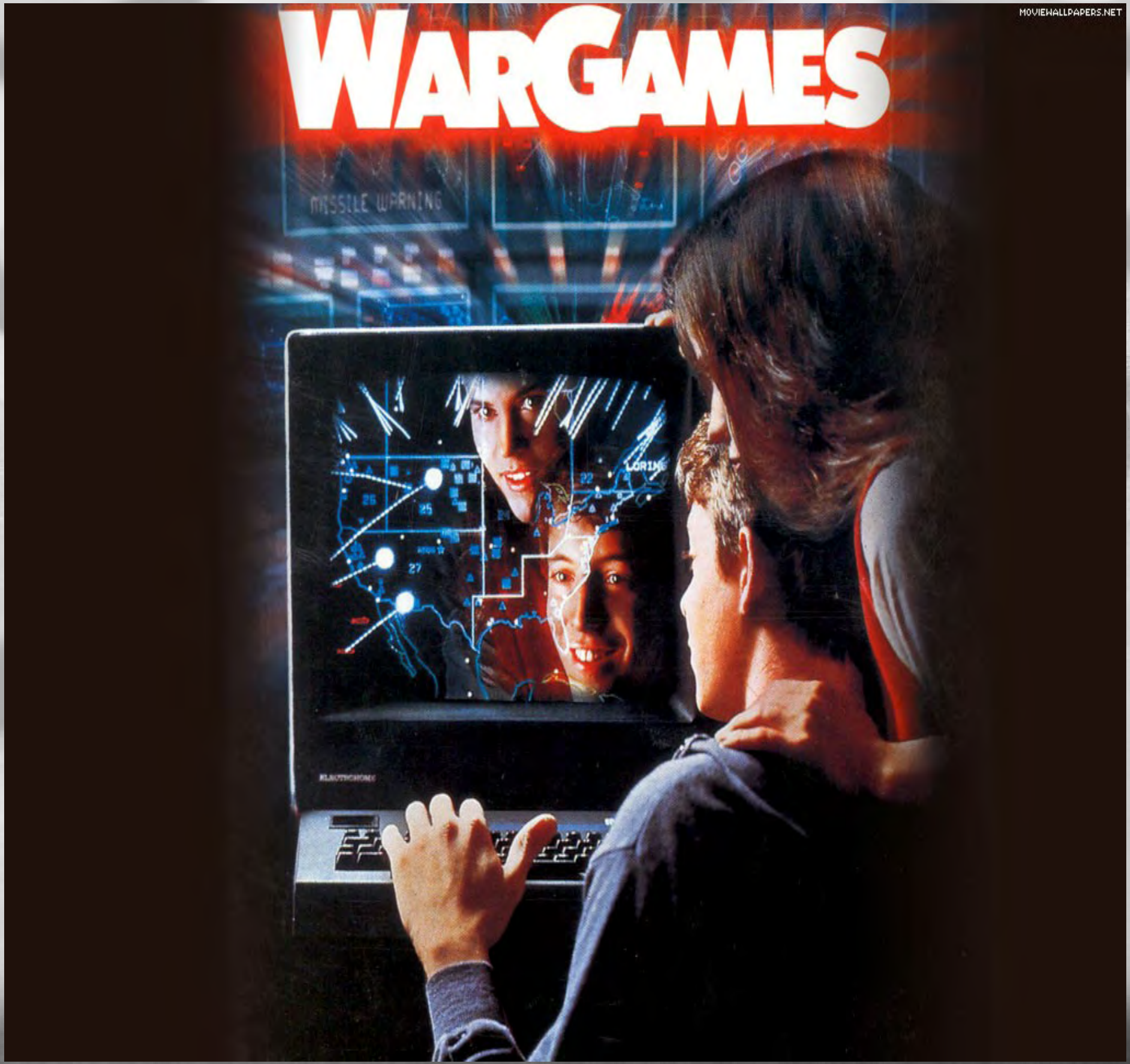
- Very slow....
- Pick up the phone dial and listen.
- Can be accurate, but that largely depends on the “hand scanners” knowledge base.
- Still a popular pass time for phreaks.
- (See http://www.handscan.net)

Automated Wardialing (Old School)

- 1980's .....



Made you this guy....



Historical Problems with Automatic Wardialing

- Typically relied on standard PSTN/POTS connections. Telcos monitor for over utilization of their service and “flag” the line for further investigation.
- In some cases they'd shut down your POTS line leaving you to explain what you where doing.
- Modems are lame. Scan for carriers (data) or tones/fax. Multiple scans. You are limited by your hardware.
- Later generation CTI hardware? Cost prohibited then, now obsolete (ISA boards!) and need PRI.
- Sure – things like randomly dialing/random timing help, but still you end up missing a lot.

Still the 80' but enter the AppleCat

- Could generate and detect tones. Good for boxing and for this talk War dialing.
- Software like Cat's Meow/Phantom Access.
- Expensive and proprietary API (Later Firmware emulated Hayes command set.
- We'll talk about his later...

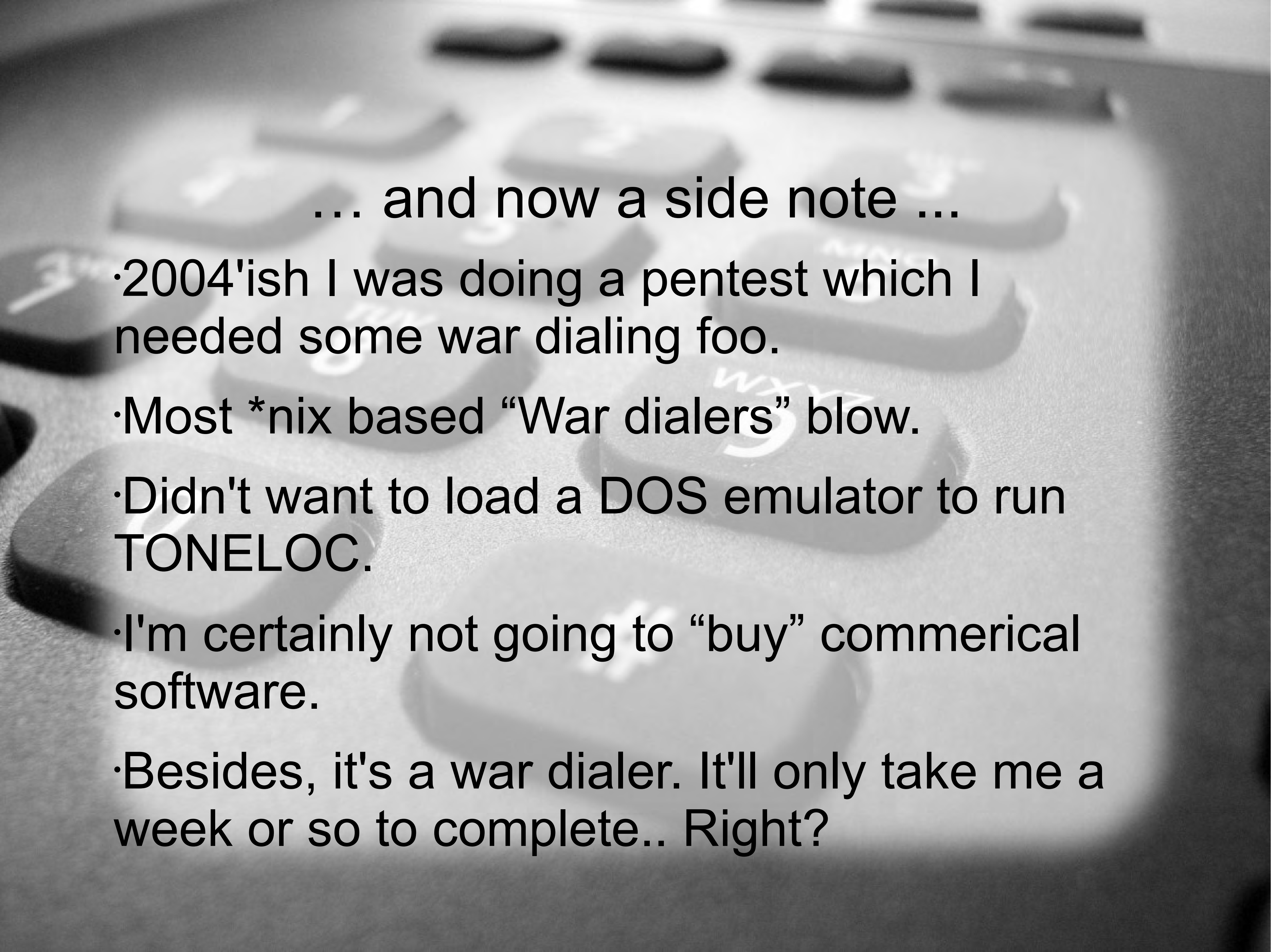
2002'ish. We can do it better. Sorta....

Enter VoIP: Less problems/different headaches. (The good)

- The world is your oyster. Cheap calls even if they supervise. If they don't, free or next to nothing.
- No longer bound to physical POTS lines.
- Less monitoring (in most cases).
- More calls and more “lines”.
- Still interesting things out there! (Routers, X.25 networks (you read that right), SCADA systems, Old school BBS's). Yup.

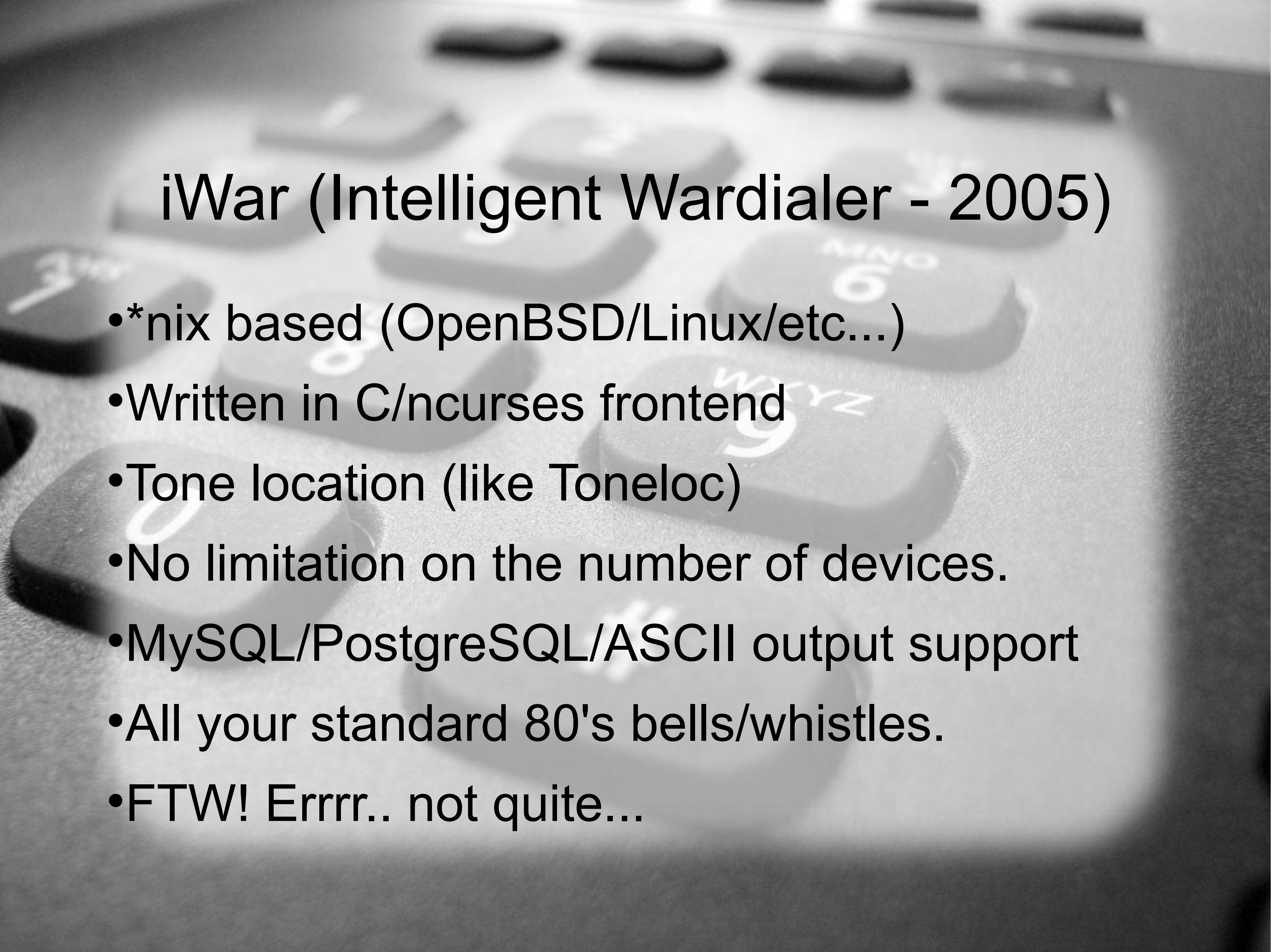
Enter VoIP: Less problems/different headaches. (The bad)

- Still bound to a crappy modem.
- Don't care how good it is......Do you really want to sit and listen to a modem?
- Not everything interesting has a carrier or tone.
- What software will you use?
- Sure, THC-SCAN and TONELOC rock... but what if you want to store to a database? Or lookup data on the tubes?



… and now a side note ...

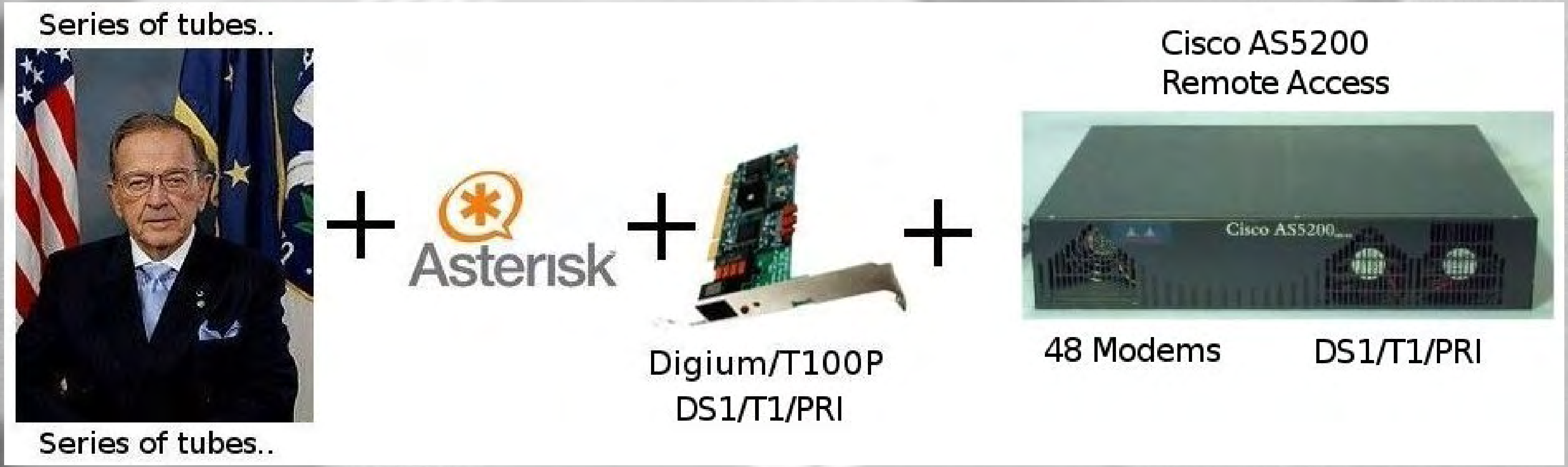
- 2004'ish I was doing a pentest which I needed some war dialing foo.
- Most *nix based “War dialers” blow.
- Didn't want to load a DOS emulator to run TONELOC.
- I'm certainly not going to “buy” commerical software.
- Besides, it's a war dialer. It'll only take me a week or so to complete.. Right?



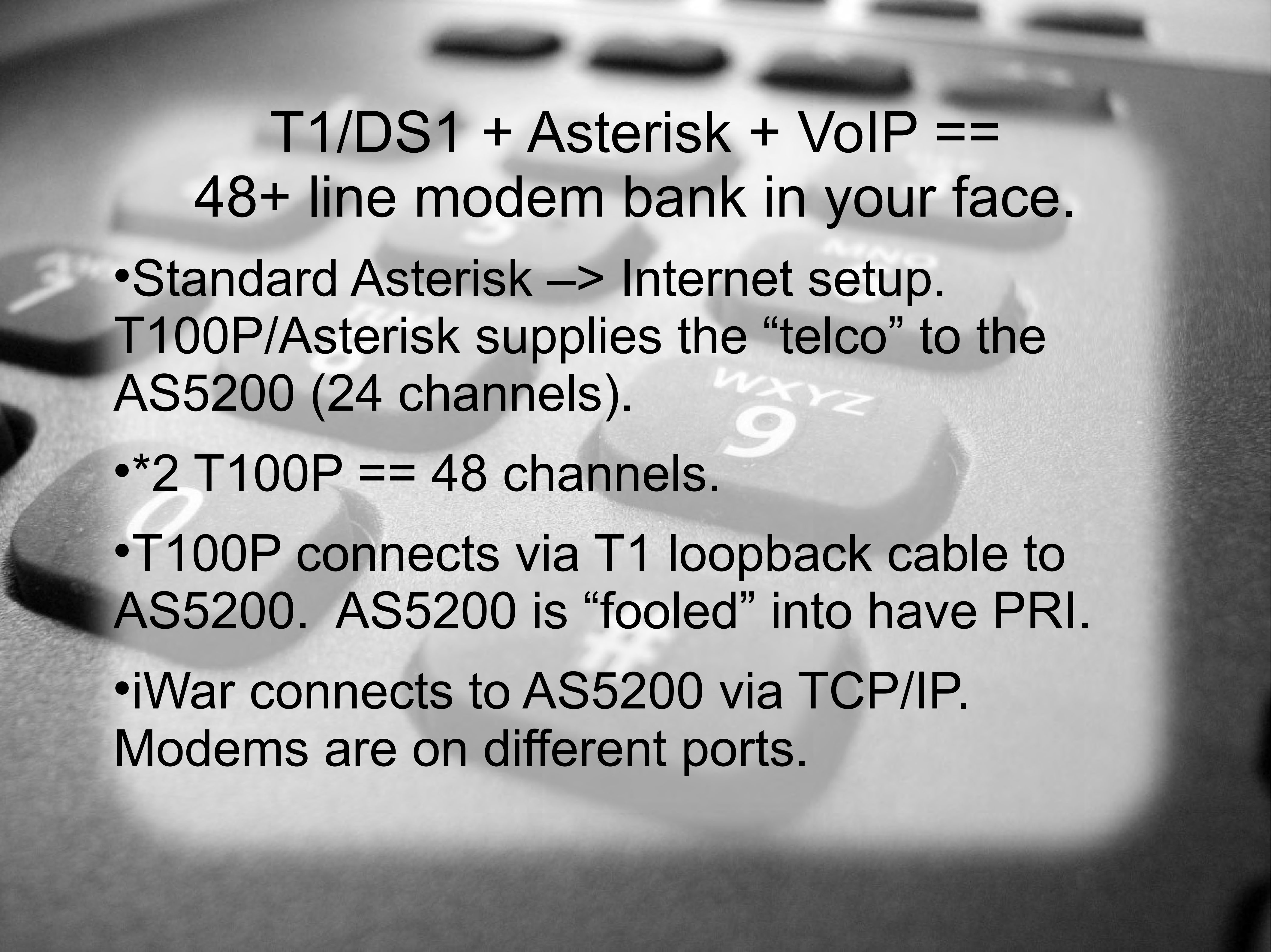
iWar (Intelligent Wardialer - 2005)

- *nix based (OpenBSD/Linux/etc...)
- Written in C/ncurses frontend
- Tone location (like Toneloc)
- No limitation on the number of devices.
- MySQL/PostgreSQL/ASCII output support
- All your standard 80's bells/whistles.
- FTW! Errrr.. not quite...

ATA+Modem = Your technique is weaksauce.
This is the way we roll...errr.. rolled...

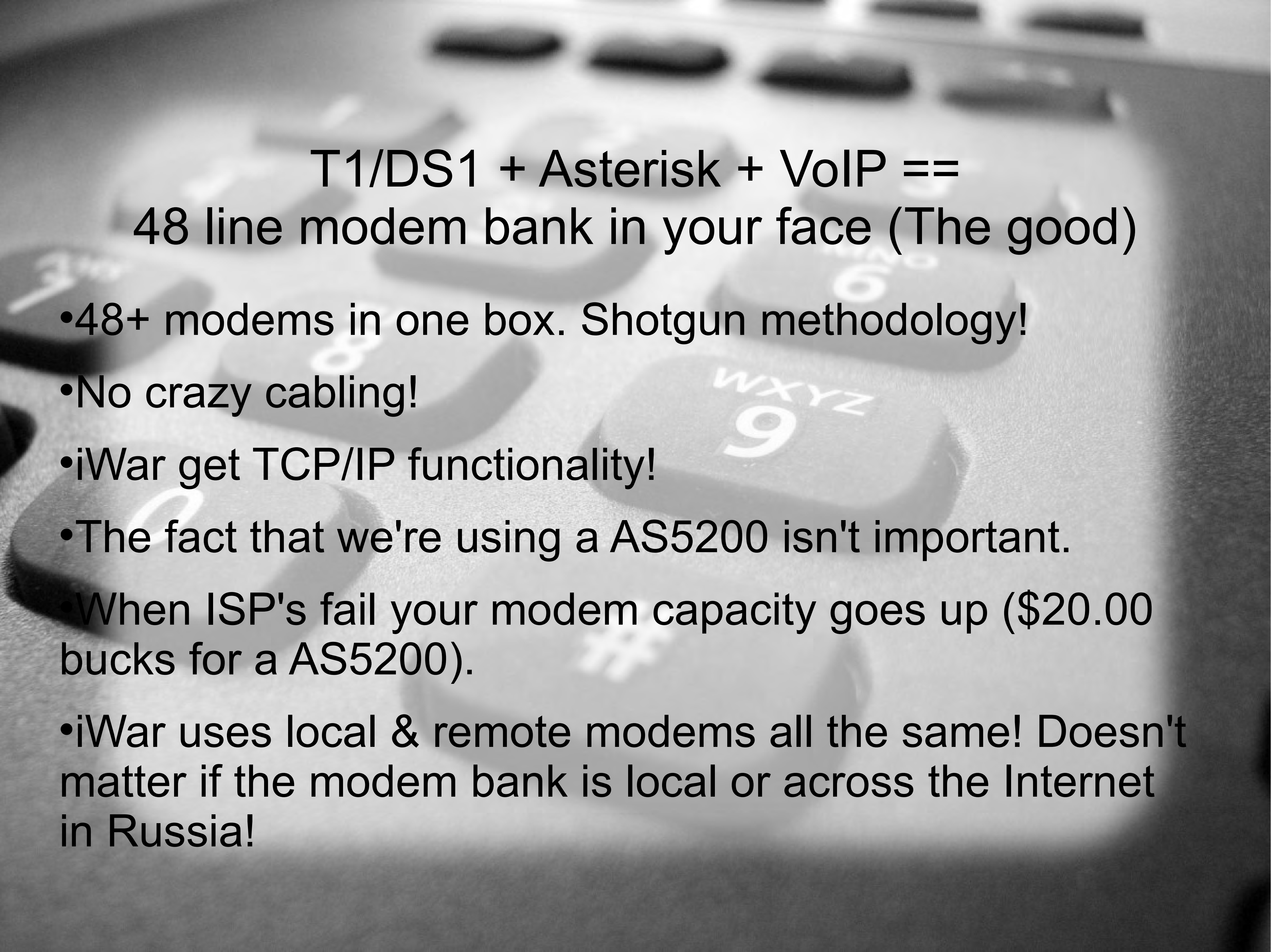


- An Old School wardialer with some chest hair!



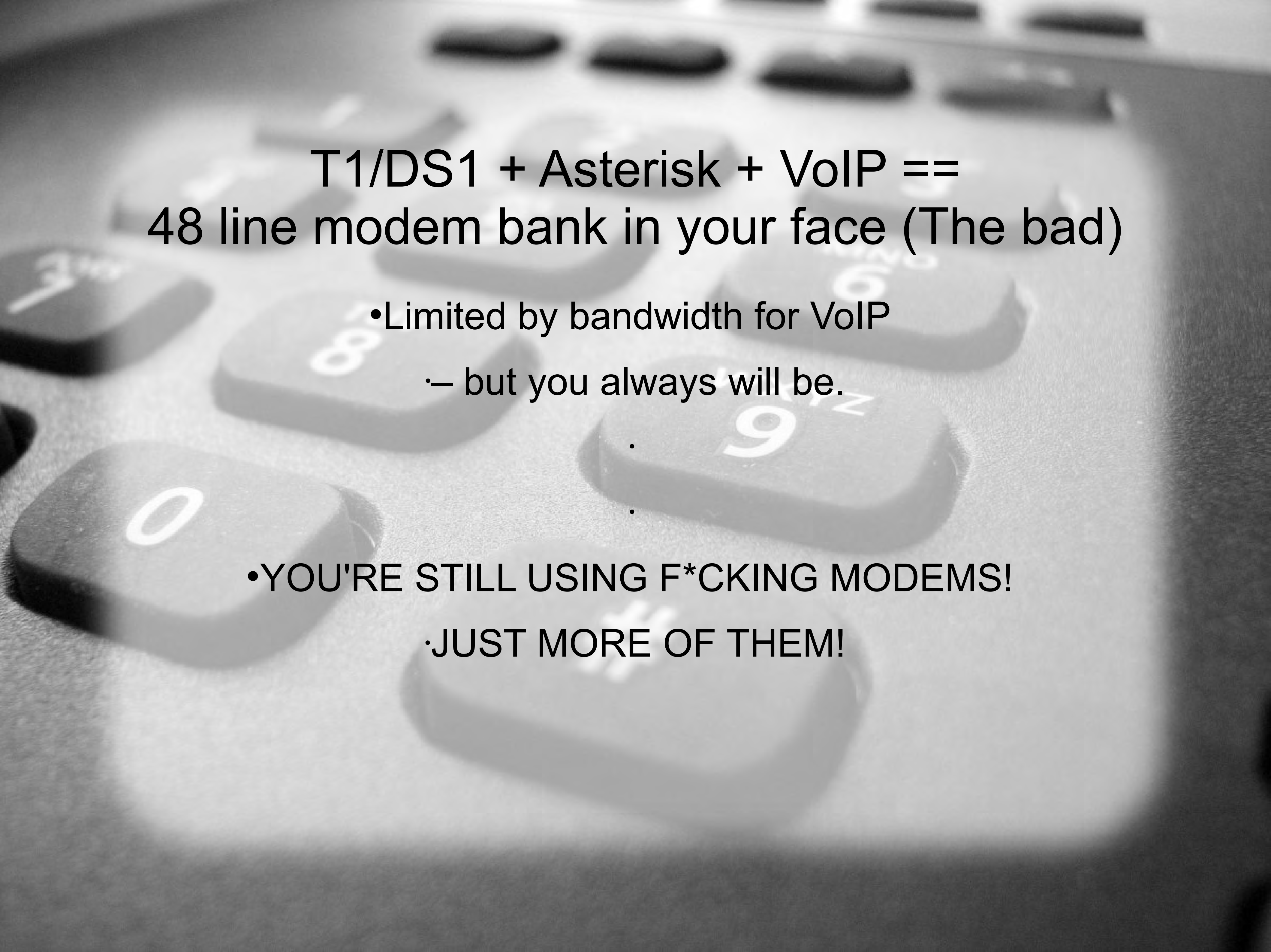
T1/DS1 + Asterisk + VoIP ==
48+ line modem bank in your face.

- Standard Asterisk –> Internet setup. T100P/Asterisk supplies the “telco” to the AS5200 (24 channels).
- *2 T100P == 48 channels.
- T100P connects via T1 loopback cable to AS5200. AS5200 is “fooled” into have PRI.
- iWar connects to AS5200 via TCP/IP. Modems are on different ports.



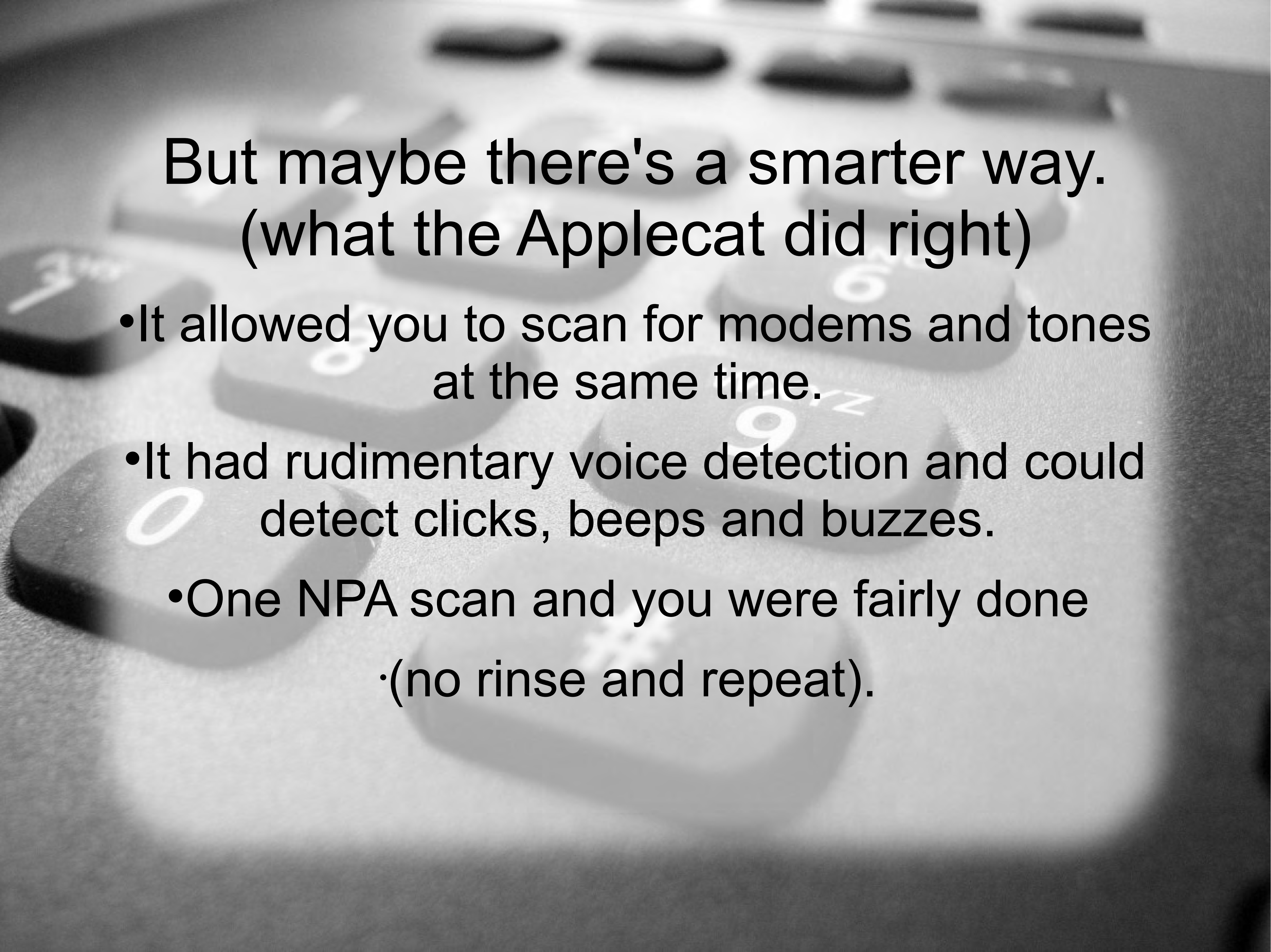
T1/DS1 + Asterisk + VoIP ==
48 line modem bank in your face (The good)

- 48+ modems in one box. Shotgun methodology!
- No crazy cabling!
- iWar get TCP/IP functionality!
- The fact that we're using a AS5200 isn't important.
- When ISP's fail your modem capacity goes up ($20.00 bucks for a AS5200).
- iWar uses local & remote modems all the same! Doesn't matter if the modem bank is local or across the Internet in Russia!



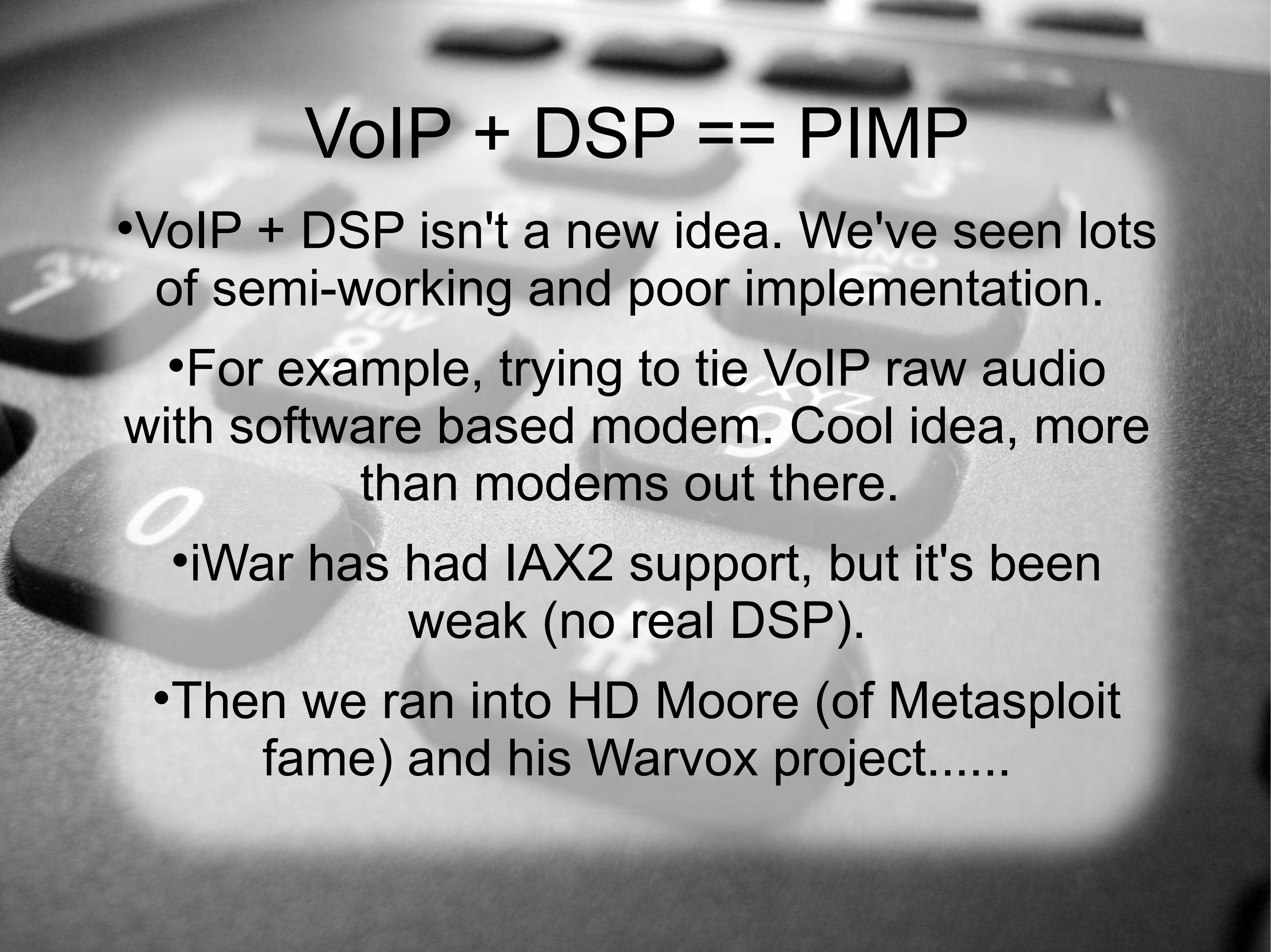
T1/DS1 + Asterisk + VoIP ==
48 line modem bank in your face (The bad)

- Limited by bandwidth for VoIP
  - – but you always will be.
  -
  -
- YOU'RE STILL USING F*CKING MODEMS!
  - JUST MORE OF THEM!



But maybe there's a smarter way. (what the Applecat did right)

- It allowed you to scan for modems and tones at the same time.
- It had rudimentary voice detection and could detect clicks, beeps and buzzes.
- One NPA scan and you were fairly done
  - (no rinse and repeat).



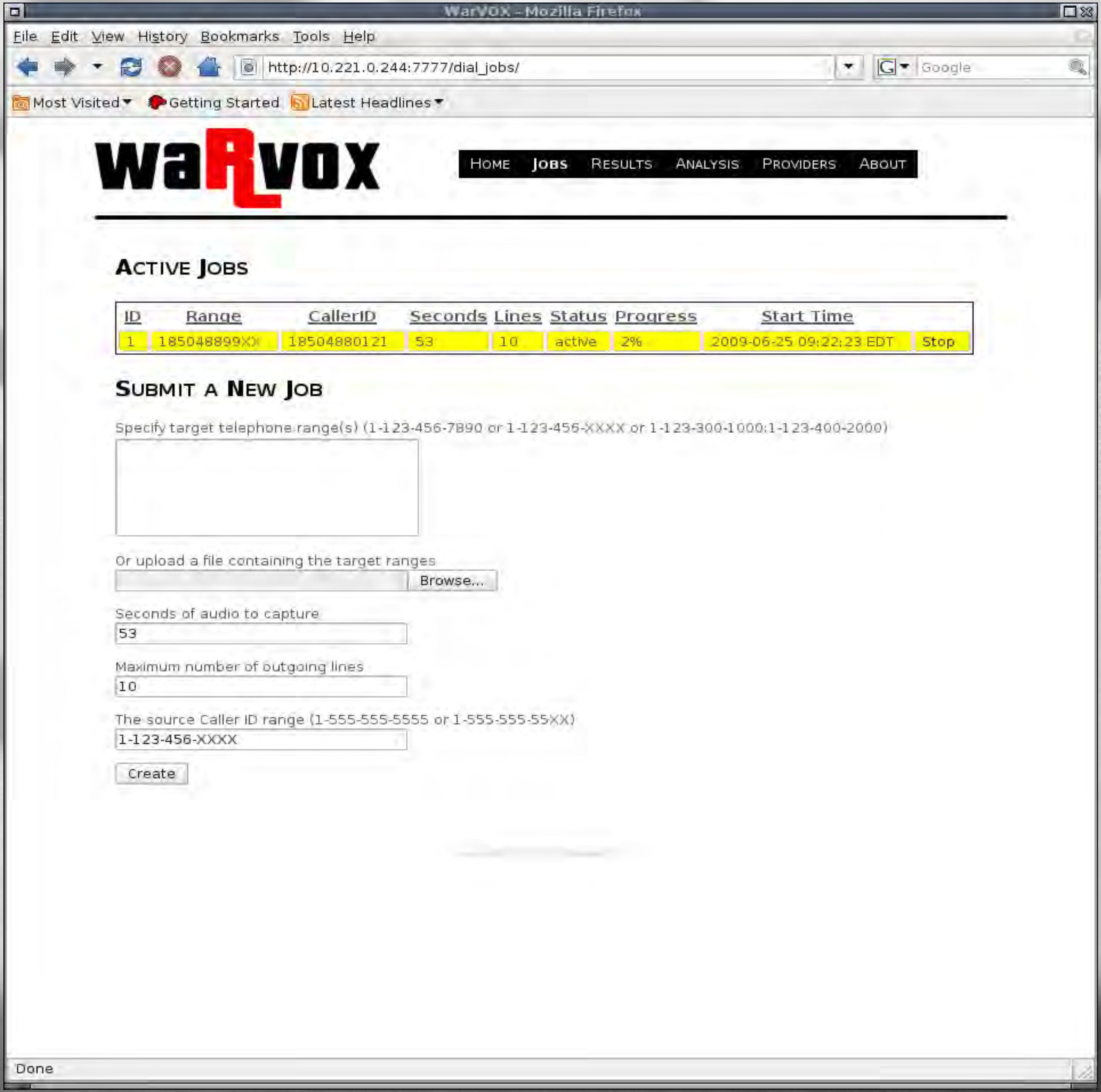
VoIP + DSP == PIMP

- VoIP + DSP isn't a new idea. We've seen lots of semi-working and poor implementation.
- For example, trying to tie VoIP raw audio with software based modem. Cool idea, more than modems out there.
- iWar has had IAX2 support, but it's been weak (no real DSP).
- Then we ran into HD Moore (of Metasploit fame) and his Warvox project......

VoIP + DSP == PIMP

- Warvox uses a dialer (IAX2 protocol) to dial/record calls.
- A Ruby backend does the analysis (to look for tones/fax/modem/etc).
- Works as part of the Metasploit frame work.
- Working with HD Moore, iWar does the same thing – Just in C, and without the really nice GUI frontend/graphics. (iWar is curses, remember?)

Warvox Screen Shot (job)


WarVOX - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://10.221.0.244:7777/dial_jobs/
Google
Most Visited
Getting Started
Latest Headlines
waRvox
HOME JOBS RESULTS ANALYSIS PROVIDERS ABOUT

ACTIVE JOBS

ID	Range	CallerID	Seconds	Lines	Status	Progress	Start Time	
1	185048899XX	18504880121	53	10	active	2%	2009-06-25 09:22:23 EDT	Stop

SUBMIT A NEW JOB

Specify target telephone range(s) (1-123-456-7890 or 1-123-456-XXXX or 1-123-300-1000:1-123-400-2000)

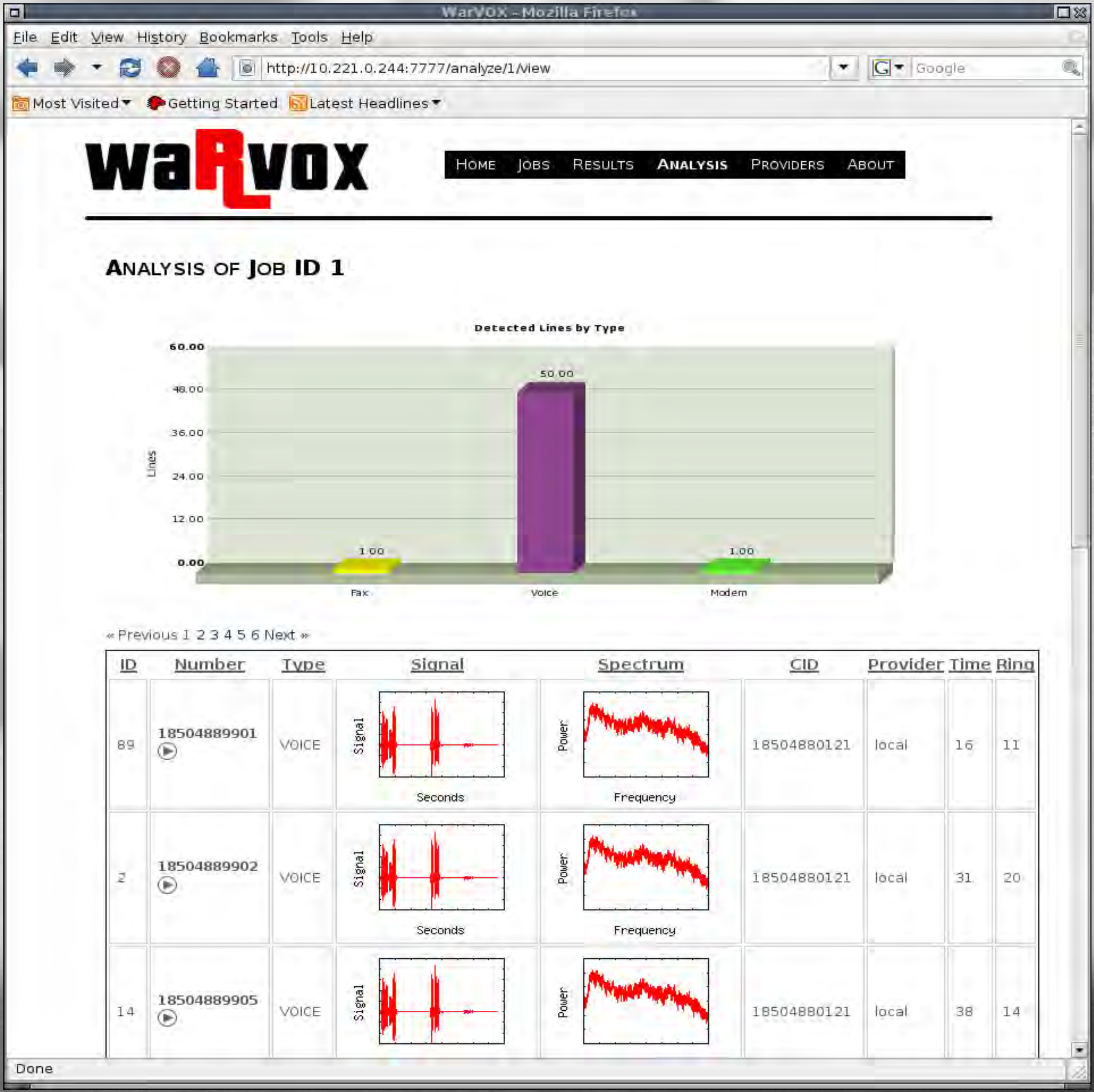
Or upload a file containing the target ranges

Seconds of audio to capture: 53

Maximum number of outgoing lines: 10

The source Caller ID range (1-555-555-5555 or 1-555-555-55XX): 1-123-456-XXXX

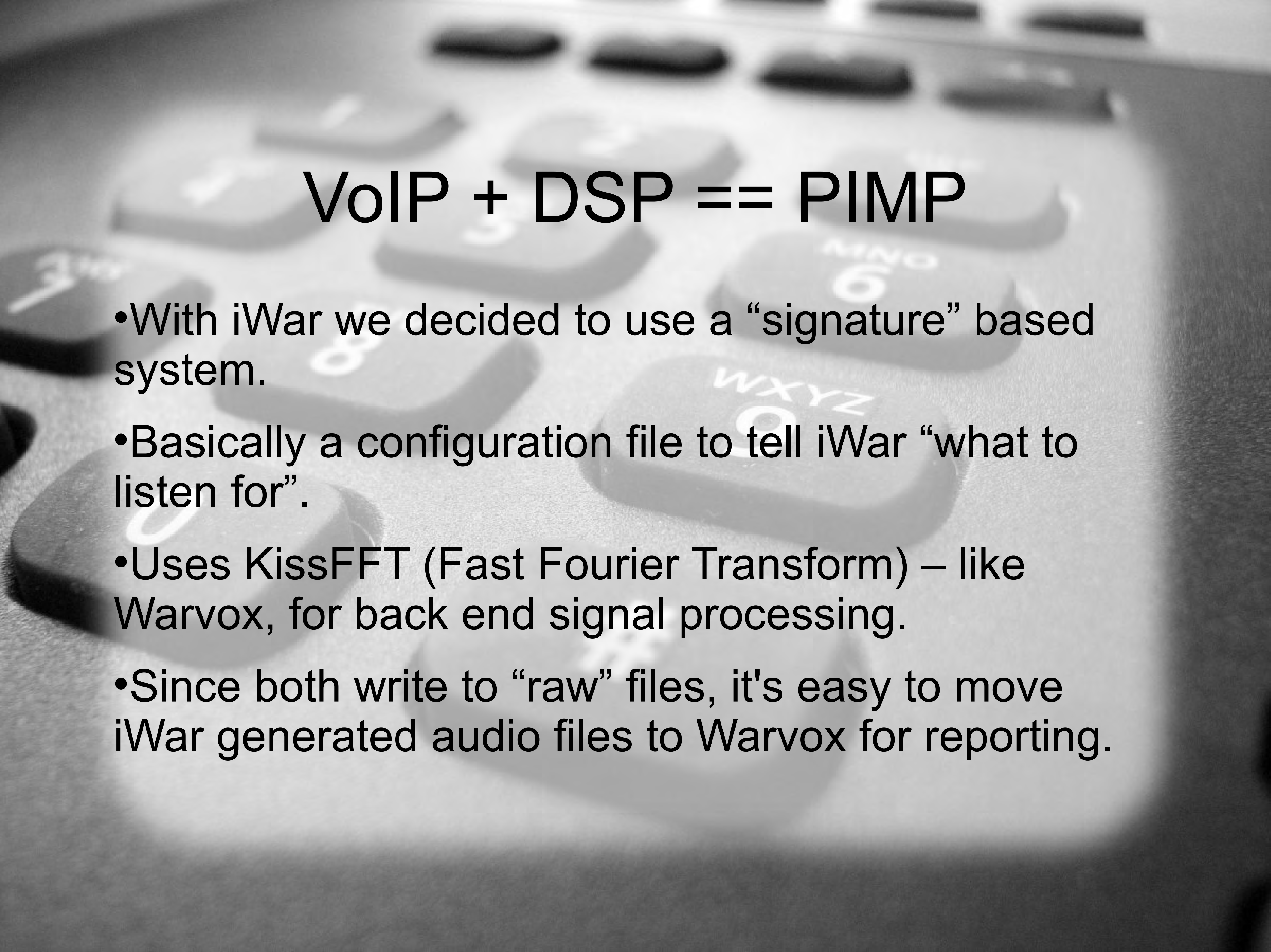
Warvox Screen Shot (analysis)



Analysis of Job ID 1

« Previous 1 2 3 4 5 6 Next »

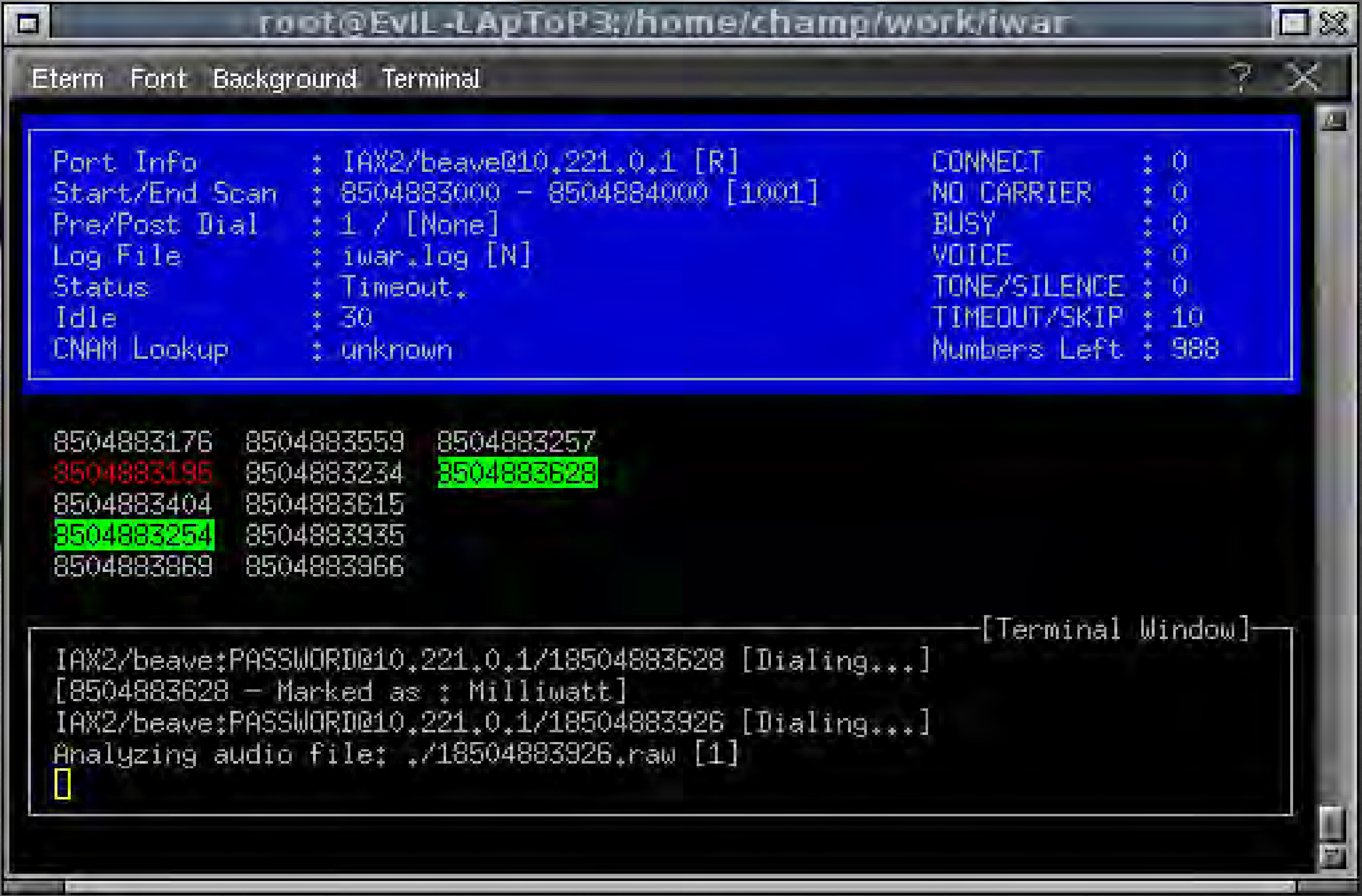
ID	Number	Type	Signal	Spectrum	CID	Provider	Time	Ring
89	18504889901 ▶	VOICE	Signal Seconds	Power Frequency	18504880121	local	16	11
2	18504889902 ▶	VOICE	Signal Seconds	Power Frequency	18504880121	local	31	20
14	18504889905 ▶	VOICE	Signal	Power	18504880121	local	38	14



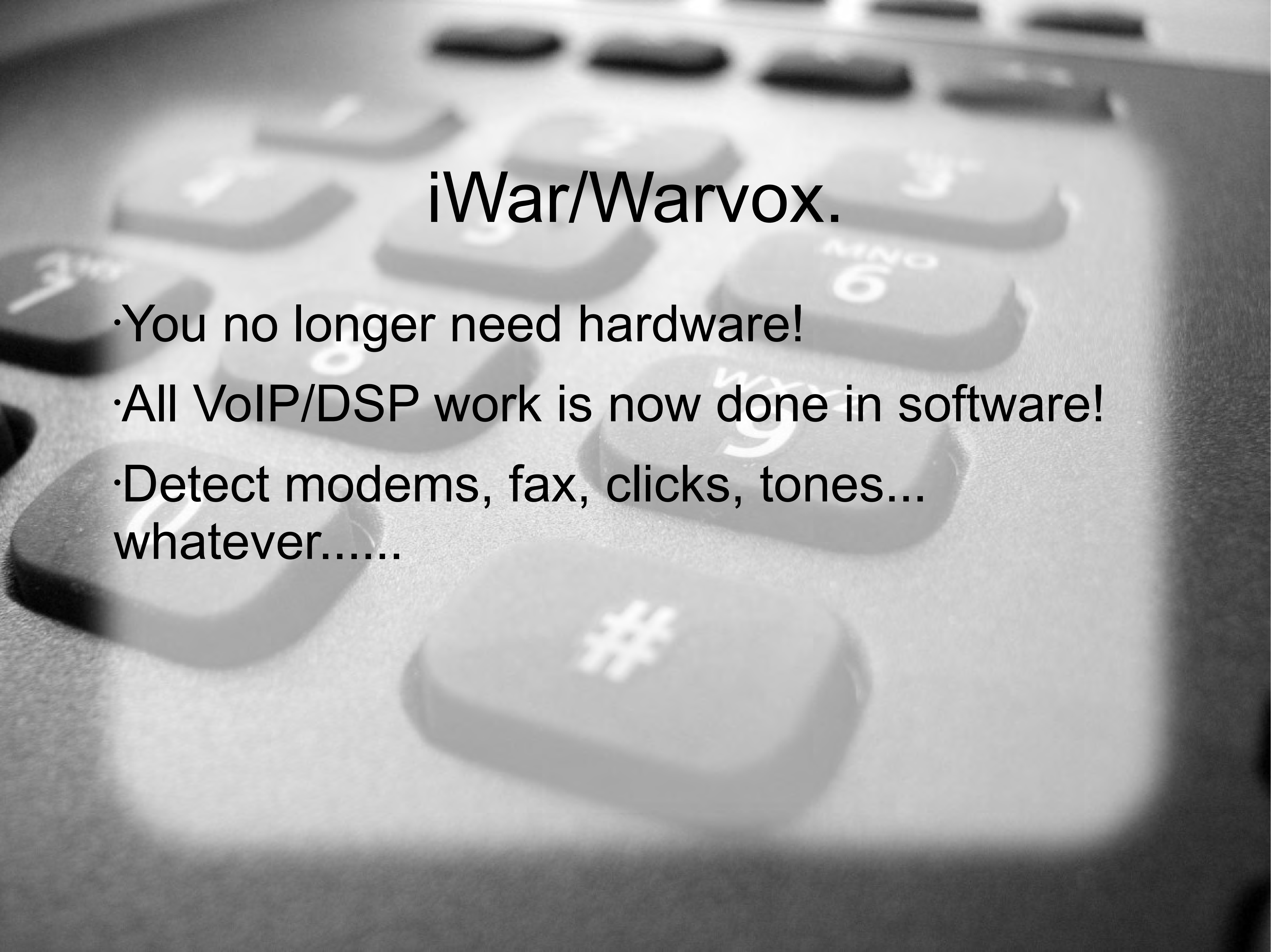
VoIP + DSP == PIMP

- With iWar we decided to use a “signature” based system.
- Basically a configuration file to tell iWar “what to listen for”.
- Uses KissFFT (Fast Fourier Transform) – like Warvox, for back end signal processing.
- Since both write to “raw” files, it's easy to move iWar generated audio files to Warvox for reporting.

iWar Screen shot

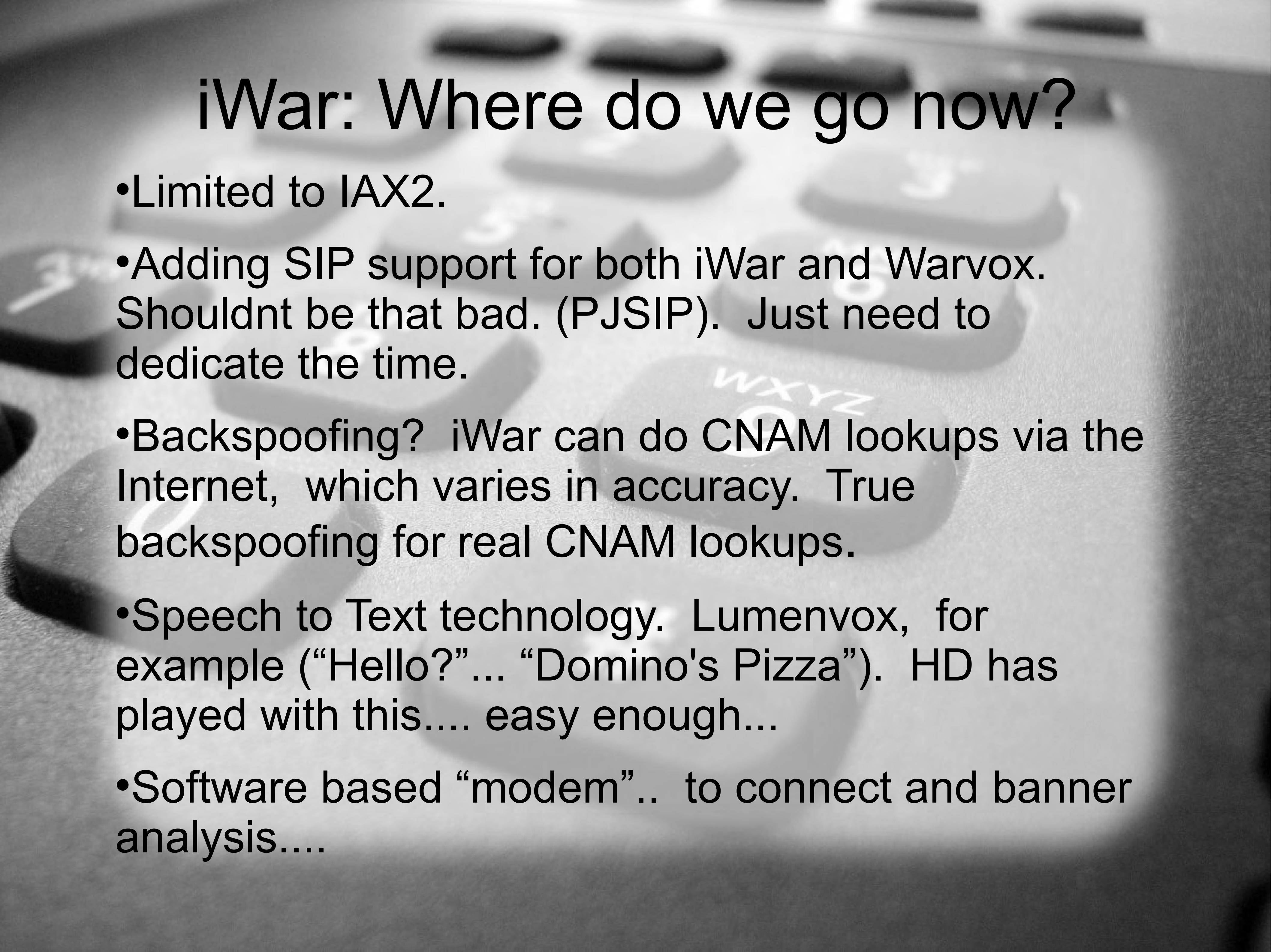


```
Port Info          : IAX2/beave@10.221.0.1 [R]           CONNECT        : 0
Start/End Scan     : 8504883000 - 8504884000 [1001]      NO CARRIER     : 0
Pre/Post Dial      : 1 / [None]                          BUSY           : 0
Log File           : iwar.log [N]                        VOICE          : 0
Status             : Timeout.                            TONE/SILENCE   : 0
Idle               : 30                                  TIMEOUT/SKIP   : 10
CNAM Lookup        : unknown                             Numbers Left   : 988

8504883176  8504883559  8504883257
8504883195  8504883234  8504883628
8504883404  8504883615
8504883254  8504883935
8504883869  8504883966

                                                                 [Terminal Window]
IAX2/beave:PASSWORD@10.221.0.1/18504883628 [Dialing...]
[8504883628 - Marked as : Milliwatt]
IAX2/beave:PASSWORD@10.221.0.1/18504883926 [Dialing...]
Analyzing audio file: ./18504883926.raw [1]
```



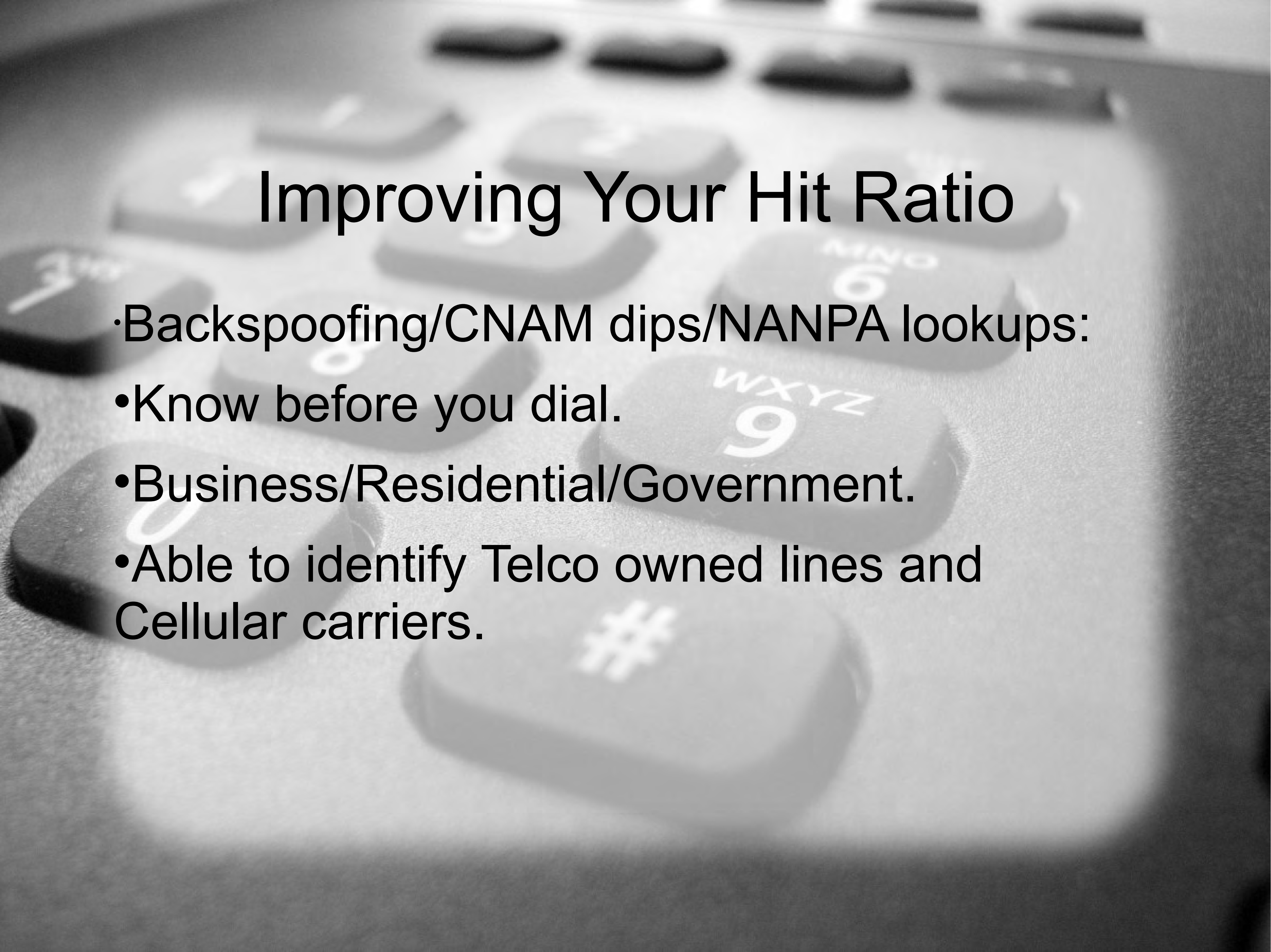
iWar/Warvox.

- You no longer need hardware!
- All VoIP/DSP work is now done in software!
- Detect modems, fax, clicks, tones... whatever......



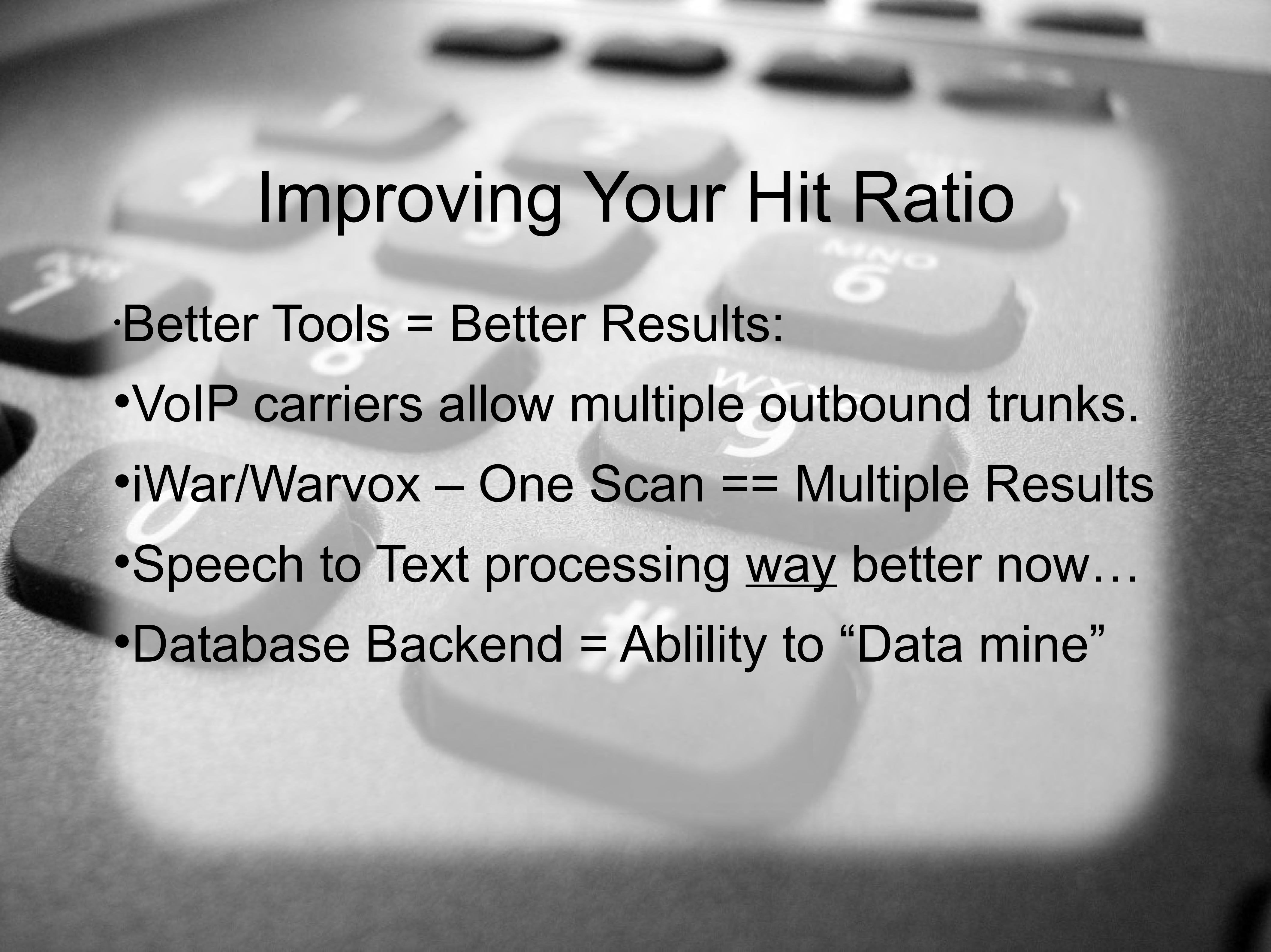
iWar: Where do we go now?

- Limited to IAX2.
- Adding SIP support for both iWar and Warvox. Shouldnt be that bad. (PJSIP). Just need to dedicate the time.
- Backspoofing? iWar can do CNAM lookups via the Internet, which varies in accuracy. True backspoofing for real CNAM lookups.
- Speech to Text technology. Lumenvox, for example (“Hello?”... “Domino's Pizza”). HD has played with this.... easy enough...
- Software based “modem”.. to connect and banner analysis....



Improving Your Hit Ratio

- Backspoofing/CNAM dips/NANPA lookups:
- Know before you dial.
- Business/Residential/Government.
- Able to identify Telco owned lines and Cellular carriers.

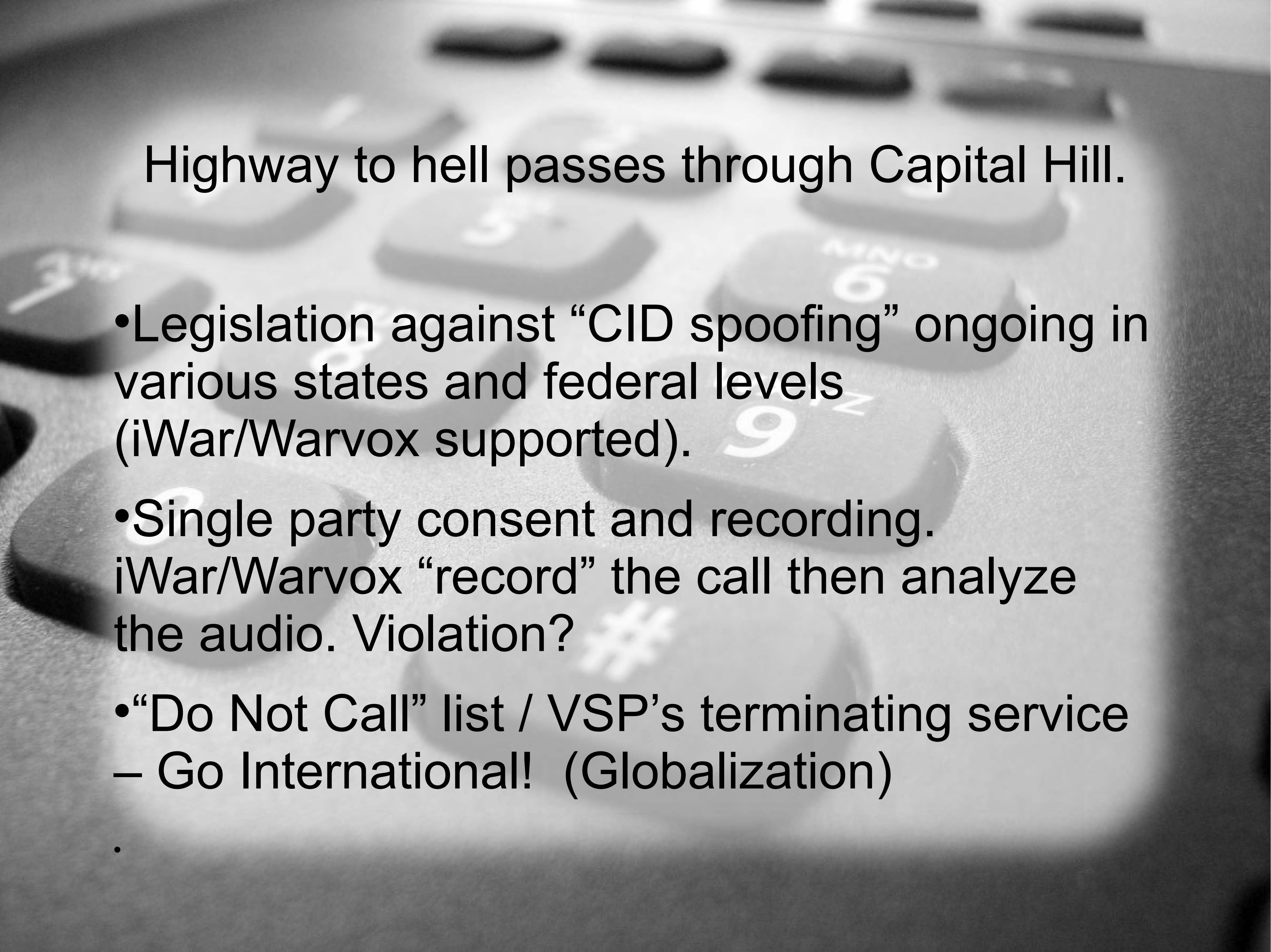


Improving Your Hit Ratio

- Better Tools = Better Results:
- VoIP carriers allow multiple outbound trunks.
- iWar/Warvox – One Scan == Multiple Results
- Speech to Text processing way better now…
- Database Backend = Ablility to “Data mine”

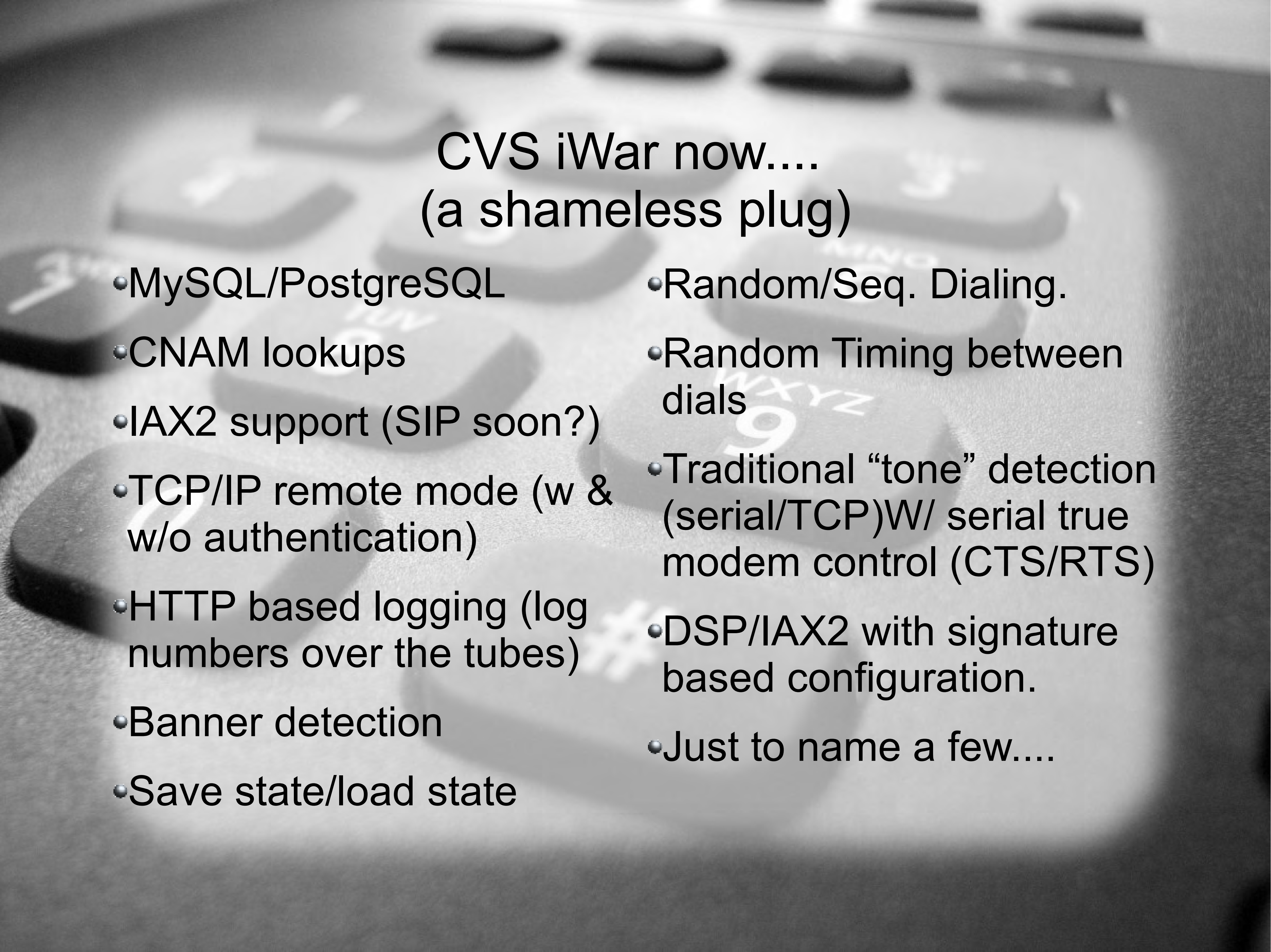
Improving Your Hit Ratio

- Better Hardware:
- Just carriers? Setup a modem bank!
- Asterisk + chan_mobile: Use those free nights and weekends! (Bluetooth <-> DAHDI)
- Any FPGA/Embedded Hackers out there? Massive DSP processing power now…



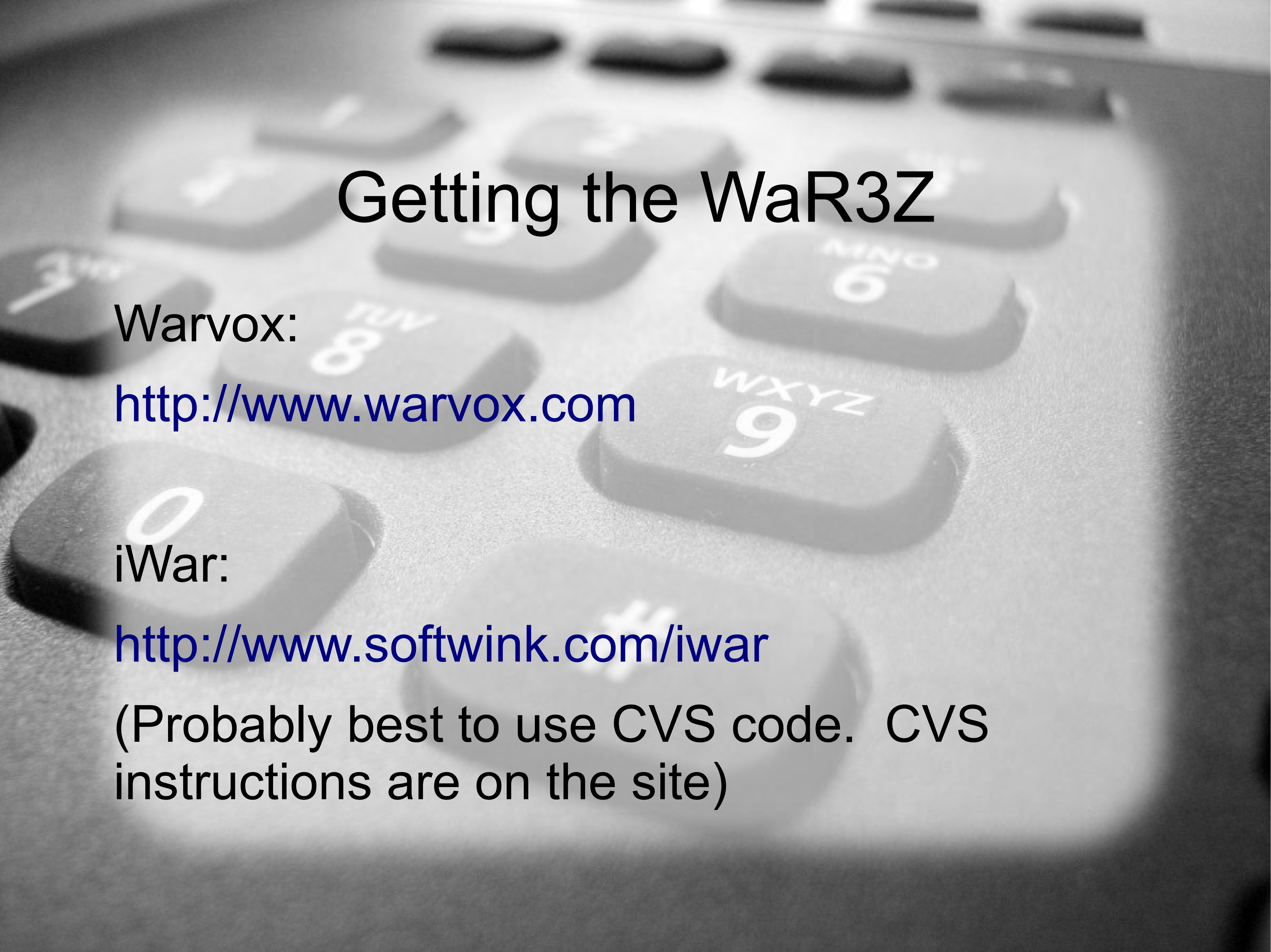
Highway to hell passes through Capital Hill.

- Legislation against “CID spoofing” ongoing in various states and federal levels (iWar/Warvox supported).
- Single party consent and recording. iWar/Warvox “record” the call then analyze the audio. Violation?
- “Do Not Call” list / VSP’s terminating service – Go International! (Globalization)
-



CVS iWar now....
(a shameless plug)

- MySQL/PostgreSQL
- CNAM lookups
- IAX2 support (SIP soon?)
- TCP/IP remote mode (w & w/o authentication)
- HTTP based logging (log numbers over the tubes)
- Banner detection
- Save state/load state
- Random/Seq. Dialing.
- Random Timing between dials
- Traditional “tone” detection (serial/TCP)W/ serial true modem control (CTS/RTS)
- DSP/IAX2 with signature based configuration.
- Just to name a few....



Getting the WaR3Z

Warvox:

http://www.warvox.com

iWar:

http://www.softwink.com/iwar

(Probably best to use CVS code. CVS instructions are on the site)

Video: What's still out there! (Where's the popcorn)

Presentation location:

http://www.telephreak.org/DC17/defcon.pdf

Presentation movie location:

http://www.telephreak.org/DC17/defcon.mov