What you didn't know your phone could do...

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About Me
- Simon Ditner, of Toronto
- Organizer for TAUG

TAUG
- Toronto Asterisk Users Group
- We're at booth 405

What I Do
- Write software
- Leverage open source
- Interested in HCI
- Particularly novel ways of viewing and accessing information

Today's Theme
- Things previously not feasible to do
- Due to cost
- Lack of access to technology
- Disconnect between I.T. and Telecom
- Preconceptions about what can be done

The future is here
- Everything is obvious
- And relatively trivial
- Only surprising due to limited options in past

Recent Changes
- Insane amounts of bandwidth
- VoIP std. SIP, H.323, IAX2 taking hold
- Commoditization of telephony hardware
- Packetization of voice
- Voice processed and routed like data

Fog around VoIP has lifted
- VoIP apps no longer vapour
- Can be used for real work
- Open Source making it easier

Applications we'll explore

- Playing text adventures over phone
- Altering your voice on the fly
- Conference call manager

Budget for these projects:
- $0.00

My goal...
- Play Zork over the telephone

Zork
- Text-based game from the late 1970's
- Before graphical computer games
- Similar to choose-your-own adventure books
- Runs on the Z-Machine

Z-Machine
- Byte code interpreter
- Write once, run anywhere
- Similar concept to Java

An sample dialogue:

The door reluctantly opens to reveal a rickety staircase descending into darkness.

> go down

You have moved into a dark place.
The trap door crashes shut, and you hear someone barring it.

It is pitch black. You are likely to be eaten by a grue.

> turn on lantern

The brass lantern is now on.
Cellar

You are in a dark and damp cellar with a narrow passageway leading north, and a crawlway to the south.

On the west is the bottom of a steep metal ramp which is unclimbable.

>go north

The Troll Room
This is a small room with passages to the east & south. Bloodstains & deep scratches

mar the walls.

A nasty-looking troll, brandishing a bloody axe, blocks all passages out of the room. The axe gets you right in the side. Ouch!

My toolbox
- Asterisk   (:-)
- Z-Machine   (bytecode interpreter)
- Sphinx2   (speech recognition)
- Festival   (text to speech)
- Perl   (scripting language)

Briefly, Asterisk is 3 things
- An IVR
  - Interactive Voice Response
- A PBX
  - Private Branch Exchange
- A Media Gateway
  - Convert calls from different formats and protocols (G.711, G.729; SIP, IAX2, SCCP)

Asterisk is extensible
- AGI
  - Asterisk Gateway Interface
- Manager API
  - A socket based event and control channel
- C Modules
  - Embedding your software into Asterisk

What I'm using out of this
- IVR (Interactive Voice Response)
- AGI(Asterisk Gateway Interface)

How does AGI make it extensible?
- Launches any external program
- Provides command path over STDIN/STDOUT
- Audio available over file descriptor 3 (EAGI only)

getting from A to Z
- increments
- built simple applications
- retrieve weather and read back
- "Today, cloudy with a high of 21..."
- simple DTMF
- "you pressed 1, 2, 3"

Chose a Z-Machine
- Found Rezrov, written in perl
- Open source
- I/O is abstracted from the actual Z-machine

Capture Output
- Collect text that would have been printed to the screen
- Pipe through Festival
- Tell asterisk to play the file using the command path

Capture Input
- Collect DTMF digits
- Translate numbers to words
- Send to Z-Machine over command path

Experiment with Sphinx2
- Capture audio in Asterisk
- Wait for pause in speaking
- Send audio to Sphinx2
- Collect recognized text
- Type it in to Zork as if from keyboard

Capture Output
- Collect text that would have been printed to the screen
- Pipe through Festival
- Tell asterisk to play the file using the command path

Time invested:
- 48 hours

Taking it further...
- Open source developers accessible
- Ran into Kevin Lenzo at Astricon
- Developer for Festival and Sphinx2
- Details on building better grammars
- Contacted author of Rezrov
- Details on extracting vocab and grammar from Zork

Vast improvements, minimal effort
- Began implementing AJAX interface
- Can track location on web
- Became less about Asterisk
- More about my application
- Limit is my imagination!

Project Site: **http://zoip.org**
- Project Test Server: **416-548-7557**