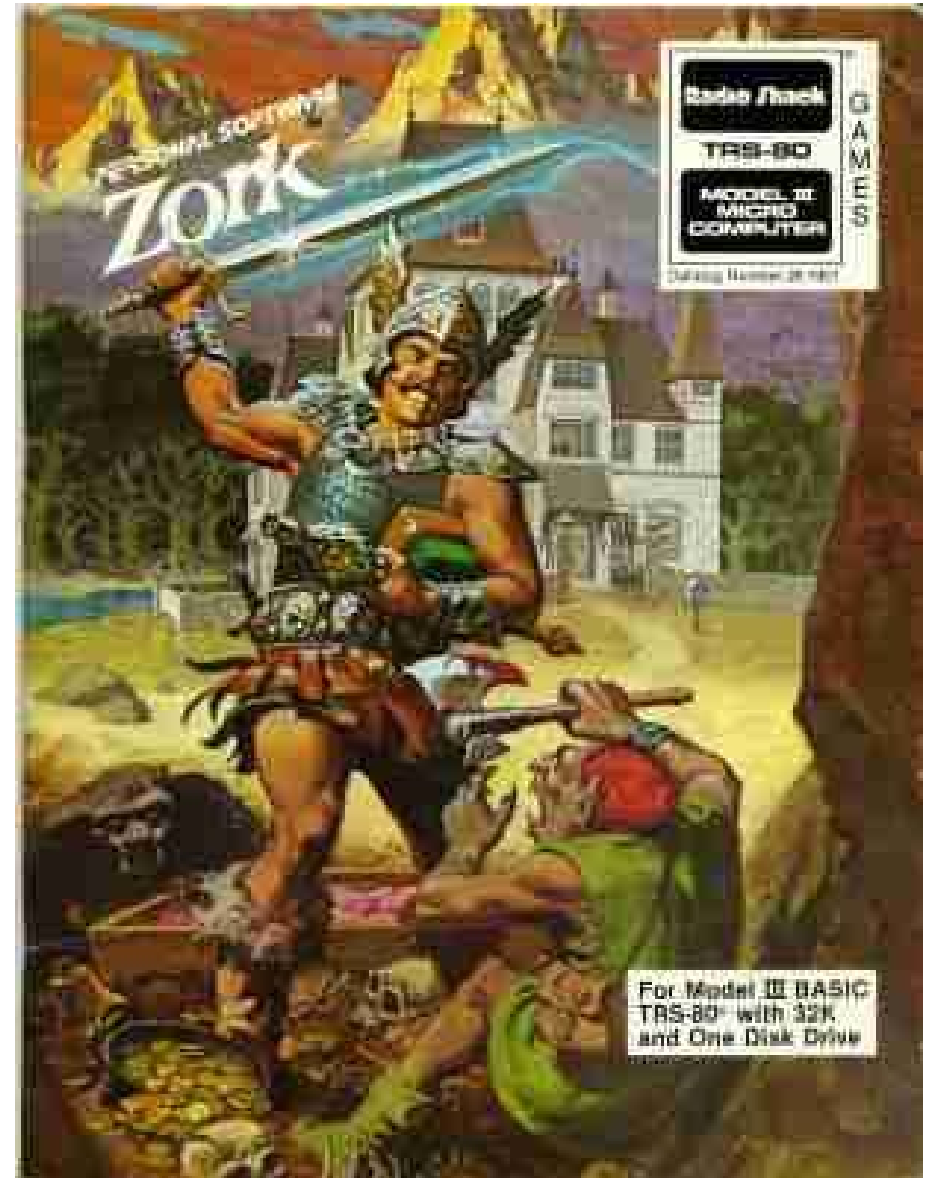


# ZoIP

Bringing Text  
Adventures to  
Life with Asterisk,  
Festival, and  
Sphinx.

Simon Ditner  
[simon@uc.org](mailto:simon@uc.org)



speech recognition

technical

words like

“lexicon”

“utterances”

“senone mapping”

“triphone states”





do you

care how it works?

not likely

care how to work it

explore

created some tools

(sp)eech (rec)ognition tools



sprec

{2 components}

1. `sprec.agi`

1. `sprec.agi`
2. `sphinx_daemon.pl`

the way it works

AGI(sprec.agi|file.wav)

AGI

# open network socket

AGI → socket

sends data to  
sphinx\_daemon.pl

AGI → socket → daemon



# sphinx\_daemon.pl

AGI → socket → daemon

# checks for matches

AGI → socket → daemon → check LM

# against language model

AGI → socket → daemon → check LM

# returns matches

AGI → socket → daemon → check LM → return

to sprec.agi

AGI → socket → daemon → check LM → return

# sprec.agi returns

AGI → socket → daemon → check LM → return

# setting $\{\text{SPREC}\}$

AGI  $\rightarrow$  socket  $\rightarrow$  daemon  $\rightarrow$  check LM  $\rightarrow$  return  $\rightarrow$   $\{\text{SPREC}\}$

{example 1}



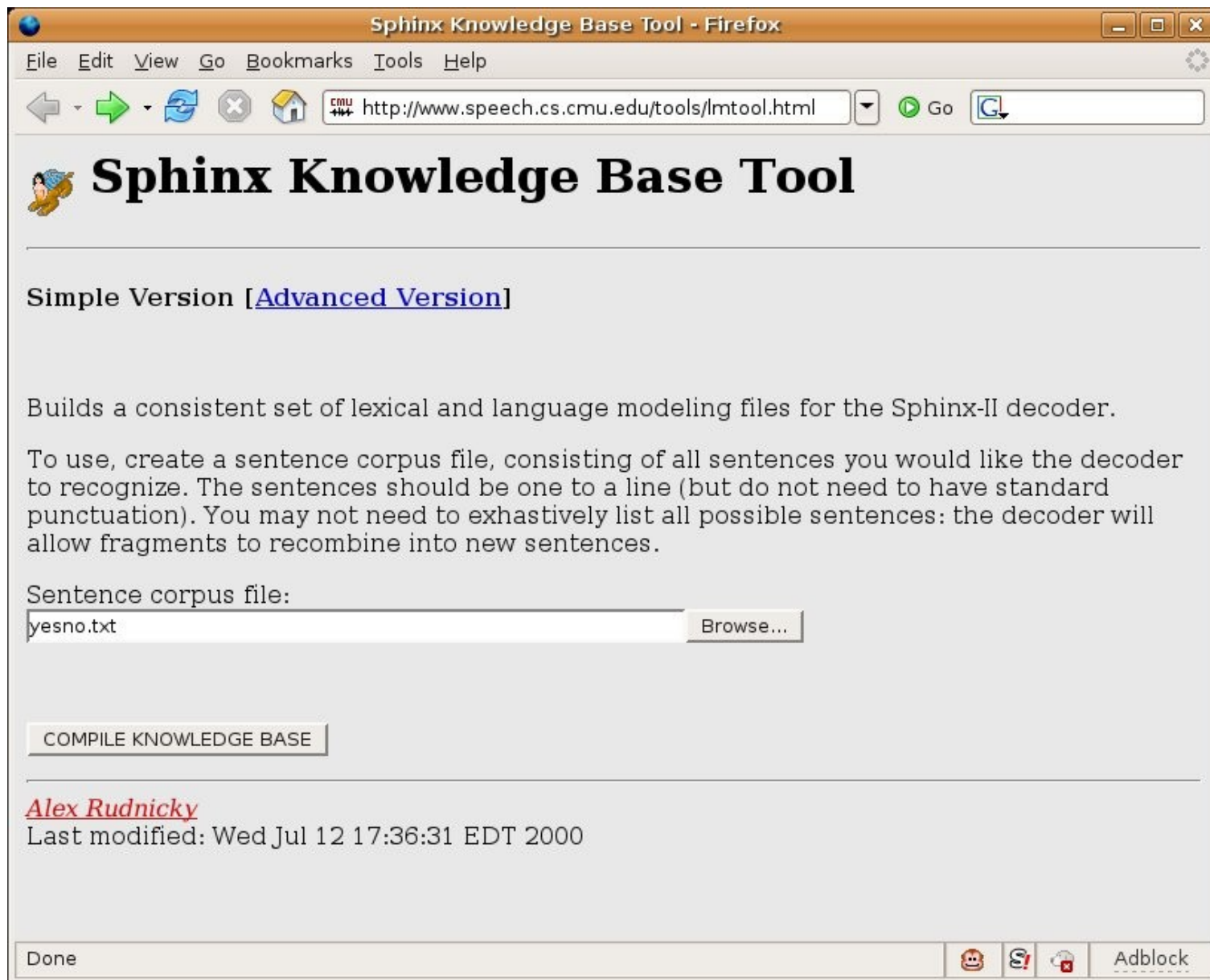
make word list

yesno.txt:

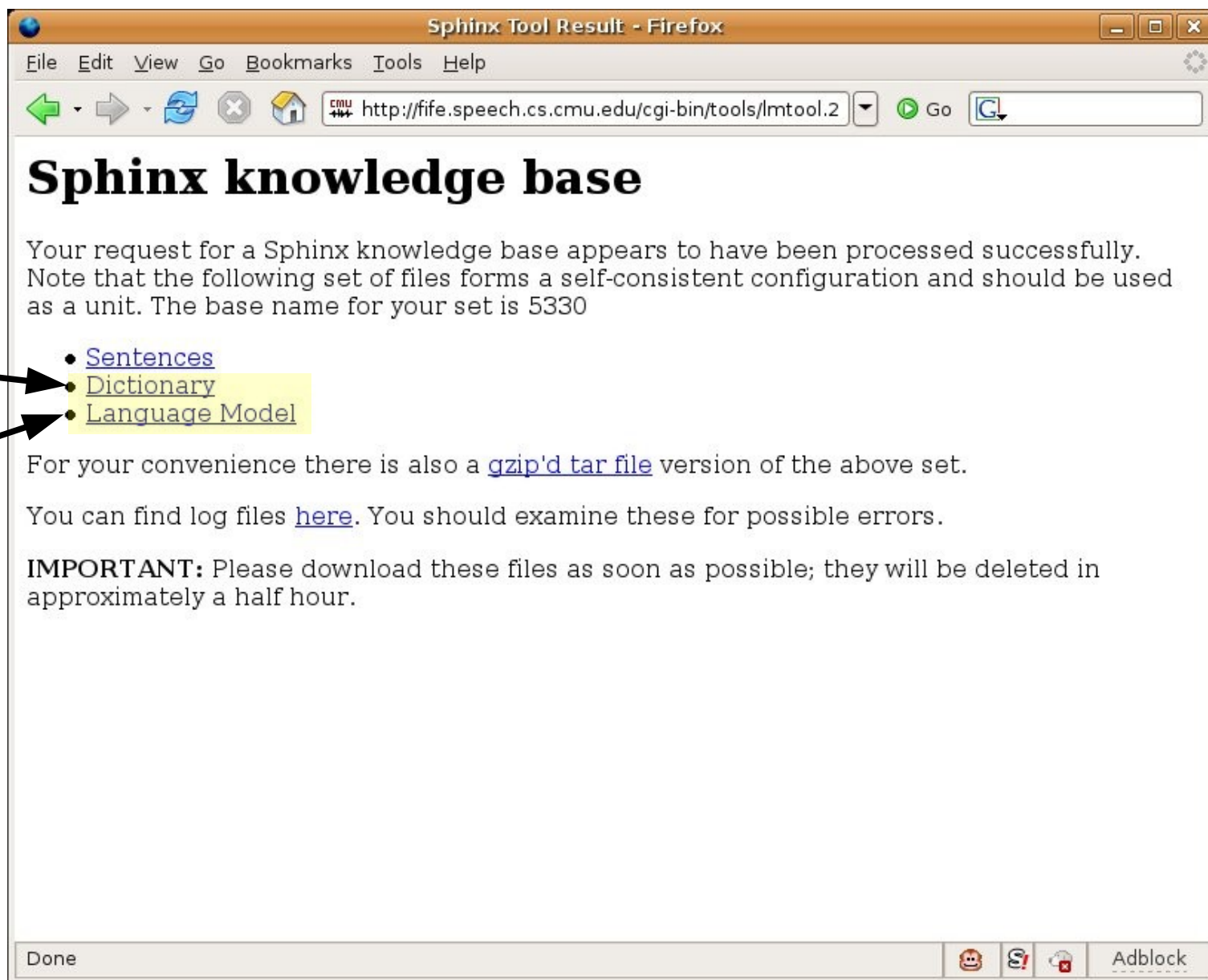
yes

no

feed into modelling  
tools



web based



creates 2 important files

1. pronunciation dictionary, .dic

NO

YES

NOW

YES

Generated File

2. language model, .lm



\1-grams:

-0.7782 </s> -0.3010  
-0.7782 <s> -0.2218  
-1.0792 NO -0.2218  
-1.0792 YES -0.2218

\2-grams:

-0.6021 <s> NO 0.0000  
-0.6021 <s> YES 0.0000  
-0.3010 NO </s> -0.3010  
-0.3010 YES </s> -0.3010

\3-grams:

-0.3010 <s> NO </s>  
-0.3010 <s> YES </s>

create directory  
share/sphinx2/lm/yesno/

```
mkdir lm/yesno
```

copy both to  
share/sphinx2/lm/yesno/

```
mkdir lm/yesno → cp *.dic *.lm lm/yesno
```

start sphinx\_daemon.pl  
with “yesno”

mkdir lm/yesno → cp \*.dic \*.lm lm/yesno → sphinx2\_daemon.pl

sphinx2\_daemon.pl --lm=yesno

mkdir lm/yesno → cp \*.dic \*.lm lm/yesno → sphinx2\_daemon.pl

# set up a dialplan

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

asterisk -rx 'extensions reload'

{place a call}



{ring ring...}

# answer call

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

# record file

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

# send files to daemon

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

# recieve words back

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

# make a decision

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/test.wav)  
exten => s,n,AGI(sprec.agi|/tmp/test.wav)  
exten => s,n,GotoIf("${SPREC}" = "YES"?yes,1)  
exten => s,n,GotoIf("${SPREC}" = "NO"?no,1)  
exten => s,n,Goto(err,1)  
  
exten => yes,1,Playback(yes)  
exten => no, 1,Playback(no)  
exten => err,1,Playback(error)
```

{fin}

it's that easy





{example 2}

**corporate directory**

dir.txt:

simon ditner  
shidan gouran  
nabeel jafferali  
jim vanmeggelen  
leif madsen

feed into modelling  
tools

1. pronunciation dictionary, .dic

DITNER	D IH T N AXR
GOURAN	G OW Y AXR AX N
JAFFERALI	JH AE F EH R AX L IY
JIM	JH IH M
LEIF	L IY F
MADSEN	M AE D S AX N
NABEEL	N AE B IY L
SHIDAN	SH AY DX AX N
SIMON	S AY M AX N
VANMEGGELN	V AE N M EH JH IX L IX N

2. language model, .lm



\1-grams:

-0.9031 </s> -0.3010  
-0.9031 <s> -0.2430  
-1.6021 DITNER -0.2430  
-1.6021 GOURAN -0.2430  
-1.6021 JAFFERALI -0.2430  
-1.6021 JIM -0.2900  
-1.6021 LEIF -0.2900  
-1.6021 MADSEN -0.2430  
-1.6021 NABEEL -0.2900  
-1.6021 SHIDAN -0.2900  
-1.6021 SIMON -0.2900  
-1.6021 VANMEGGELEN -0.2430  
...

\2-grams:

-1.0000 <s> JIM 0.0000  
-1.0000 <s> LEIF 0.0000  
-1.0000 <s> NABEEL 0.0000  
-1.0000 <s> SHIDAN 0.0000  
-1.0000 <s> SIMON 0.0000  
-0.3010 DITNER </s> -0.3010  
-0.3010 GOURAN </s> -0.3010  
-0.3010 JAFFERALI </s> -0.3010  
-0.3010 JIM VANMEGGELEN 0.0000  
-0.3010 LEIF MADSEN 0.0000  
-0.3010 MADSEN </s> -0.3010  
-0.3010 NABEEL JAFFERALI 0.0000  
...

-0.3010 SHIDAN GOURAN 0.0000  
-0.3010 SIMON DITNER 0.0000  
-0.3010 VANMEGGELEN </s> -0.3010

\3-grams:

-0.3010 <s> JIM VANMEGGELEN  
-0.3010 <s> LEIF MADSEN  
-0.3010 <s> NABEEL JAFFERALI  
-0.3010 <s> SHIDAN GOURAN  
-0.3010 <s> SIMON DITNER  
-0.3010 JIM VANMEGGELEN </s>  
-0.3010 LEIF MADSEN </s>  
-0.3010 NABEEL JAFFERALI </s>  
-0.3010 SHIDAN GOURAN </s>  
-0.3010 SIMON DITNER </s>

create directory  
share/sphinx2/lm/dir/

```
mkdir lm/dir
```

copy both to  
share/sphinx2/lm/dir/

```
mkdir lm/dir → cp *.dic *.lm lm/dir
```

start sphinx\_daemon.pl  
with “dir”

mkdir lm/dir → cp \*.dic \*.lm lm/dir → sphinx2\_daemon.pl

`sphinx2_daemon.pl --lm=dir`

`mkdir lm/dir → cp *.dic *.lm lm/dir → sphinx2_daemon.pl`

# set up a dialplan

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/dir.wav)  
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)  
exten => s,n,GotoIf($["${SPREC}" = ""]?err,1)  
exten => s,n,Macro(FindExten|${SPREC})  
  
exten => err,1,Playback(name_not_found)  
exten => err,n,Playback(try_again)  
exten => err,n,Goto(s,2)
```



asterisk -rx 'extensions reload'

{place a call}

{ring ring...}

# answer call

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/dir.wav)  
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)  
exten => s,n,GotoIf("${SPREC}" = "")?err,1)  
exten => s,n,Macro(FindExten|${SPREC})  
  
exten => err,1,Playback(name_not_found)  
exten => err,n,Playback(try_again)  
exten => err,n,Goto(s,2)
```

# record file

```
exten => s,1,Answer()
```

```
exten => s,2,Record(/tmp/dir.wav)
```

```
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)
```

```
exten => s,n,GotoIf("${SPREC}" = "")?err,1)
```

```
exten => s,n,Macro(FindExten|${SPREC})
```

```
exten => err,1,Playback(name_not_found)
```

```
exten => err,n,Playback(try_again)
```

```
exten => err,n,Goto(s,2)
```

# send file to daemon

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/dir.wav)  
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)  
exten => s,n,GotoIf("${SPREC}" = "")?err,1)  
exten => s,n,Macro(FindExten|${SPREC})  
  
exten => err,1,Playback(name_not_found)  
exten => err,n,Playback(try_again)  
exten => err,n,Goto(s,2)
```

# recieve words back

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/dir.wav)  
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)  
exten => s,n,GotoIf("${SPREC}" = "")?err,1)  
exten => s,n,Macro(FindExten|${SPREC})  
  
exten => err,1,Playback(name_not_found)  
exten => err,n,Playback(try_again)  
exten => err,n,Goto(s,2)
```

# make a decision

```
exten => s,1,Answer()  
exten => s,2,Record(/tmp/dir.wav)  
exten => s,n,AGI(sprec.agi|/tmp/dir.wav)  
exten => s,n,GotoIf("${SPREC}" = "")?err,1)  
exten => s,n,Macro(FindExten|${SPREC})  
  
exten => err,1,Playback(name_not_found)  
exten => err,n,Playback(try_again)  
exten => err,n,Goto(s,2)
```



it's that easy



you can do it today

sprec 0.1

[uc.org/sprec](https://uc.org/sprec)

{comments?}

{suggestions?}

{blank slide}