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Voice,
Web
& Mobile
Solutions **&**
Services
which
make
communication
more **effective**
& more
efficient"

APF Manual



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1. APF

APF is the process of concatenation of several prompts to one fluently sounding sentence, especially used for the pronunciation of numbers, currencies, date, time etc. The abbreviation APF stands for *Automatic Pronunciation Functions*.

1.1. The Comsys APF service

The Comsys APF Service is a Tomcat based web application which allows access from every web based (voice) application. By simply submitting all necessary information, it concatenates the audio fragments into one streaming response with respect of the language rules (if the language is supported, see chapter 5, *Currently supported languages*). At the moment, the following functions are supported:

- Number Pronunciation Function (npf.wav) see paragraph 2.1 on page 6
- Money Pronunciation Function (mpf.wav) see paragraph 2.2 on page 8
- Date Pronunciation Function (dpf.wav) see paragraph 2.3 on page 12
- Time Pronunciation Function (tpf.wav) see paragraph 2.4 on page 14
- Number Solo Pronunciation Function (nspf.wav) see paragraph 2.5 on page 16

Each function can be accessed as a servlet. The extension *.wav* is added to the servlet mapping to use it in a VoiceXML <audio> tag. By doing so, the APF can be used in a static VXML document as well.

2. APF functions

2.1. npf (Number Pronunciation Function)

Pronounces a number. The maximum number that can be processed is : 999,999,999,999

Parameter	Description	Required	Comment
baseUrl	Base path to the wave (.wav) files	yes	http://localhost:8080/myapp/prompts
language	[<country>/]<language>	yes	<p>Example : ch/de In this case, the rules for the function will be german (de) rules, but the prompts must be found in <basePath>/ch/de</p> <p>Country: The country is optional. If not present, the country and language will be the same.</p> <p>Language: Language in 2 digits, nl,NL, GB, gb, DE, de etc. <i>see Currently supported languages</i></p>
Number	Number to pronounce	yes	
finalPhrase	Whether the last item of the number must be pronounced with end intonation or not	yes	true or false
numFormat	<i>The format in witch the number must be pronounced. Where scale precision G stands for the billions, M for the millions, K for the thousands and H for the hundreds, 'o' for 'one' and 'a' for 'and'</i>	no	<p>The 'o' before the scale precision points whether the 'one' should be pronounced preceding the precision, if it's exactly one. The 'a' after the precision points whether 'and' should be pronounced after the scale.</p> <p>Example: the number 150,254 with format "oHaoB-oHaoG-oHaoK-oH-"</p> <p>Should be pronounced as "one hundred and fifty thousand two hundred fifty four". To turn of the pronunciation of the "one" and "and" use the `` sign. If the format is not supplied, the default for the language is used.</p>

2.1.1. VXML example

```
<?xml version='1.0'?>
<vxml version="2.0">
  <form id="main">
    <var name="language" expr="'gb'"/>
    <field name="number" type="digits">
      <prompt>
        Enter a number.
      </prompt>
      <filled>
        <prompt>
          The number you have entered is:
        </prompt>
        <audio
          expr="'http://localhost:8080/apfv1_2_0/npf.wav?baseurl=http://localhost:8080/apftest/prompts&language=' + language + '&number=' + number + '&finalPhrase=true'"/>
        </prompt>
        <goto nextitem="number"/>
      </filled>
    </field>
  </form>
</vxml>
```

2.2. mpf (Money Pronunciation Function)

Pronounces an amount. The maximum number that can be processed is : 999,999,999,999.99

Parameter	Description	Required	Comment
baseUrl	Base path to the wave (.wav) files	yes	http://localhost:8080/myapp/prompts
language	[<country>/]<language>	yes	Example : ch/de In this case, the rules for the function will be german (de) rules, but the prompts must be found in <basePath>/ch/de Country: The country is optional. If not present, the country and language will be the same. Language: Language in 2 digits, nl,NL, GB, gb, DE, de etc. <i>see Currently supported languages</i>
Balance	Amount to pronounce	yes	Should contain a decimal sign ('.') and the mantissa must be 2 digits.
finalPhrase	Whether the last item of the number must be pronounced with end intonation or not	yes	true or false
numFormat	The format in witch the number must be pronounced. Where scale precision G stands for the billions, M for the millions, K for the thousands and H for the hundreds, 'o' for 'one' and 'a' for 'and'	no	See <i>npf (Number Pronunciation Function)</i> on page 6.
apFormat	How the different numbers must be pronounced	no	See <i>Format schemes</i> below.
currency	The currency to be pronounced	<i>no</i>	See <i>Currently supported currencies</i>

2.2.1. Format schemes

The format schemes are used to define how a balance should be pronounced. The format is optional, if it's not supplied, the default for the specific language is chosen. If it is supplied, all of the schemes must be present, i.e. "Z5P9N1" is invalid!

Example : "Z5R5C1P9N7"

Number	Is pronounced as:
0.00	zero euro and zero cents
25.00	Twenty-five euro and zero cents
0.40	Forty cents
56.78	Fifty-six euro and seventy-eight cents
-66.12	minus sixty-six euro and twelve cents.

2.2.1.1. zero scheme (Z)

- 1 zero euro.
- 2 zero euro exactly.
- 3 zero euro zero.
- 4 zero euro zero cents.
- 5 zero euro and zero cents.

2.2.1.2. Round units scheme (R)

- 1 <25> euro.
- 2 <25> euro exactly.
- 3 <25> euro zero.
- 4 <25> euro zero cents.
- 5 <25> euro and zero cents.

2.2.1.3. Round mantissa scheme (C)

- 1 <25> cents.
- 2 Zero euro <25> cents.
- 3 Zero euro and <25> cents.

2.2.1.4. Positive scheme (P)

- 1 <12> euro <25>.
- 2 plus <12> euro <25>.
- 3 <12> euro <25> positive.
- 4 <a positive balance of > <12> euro <25>.
- 5 <12> euro <25> cents.
- 6 plus <12> euro <25> cents.
- 7 <12> euro <25> cents positive.
- 8 <a positive balance of > <12> euro <25> cents.
- 9 <12> euro and <25> cents.
- 10 plus <12> euro and <25> cents.
- 11 <12> euro and <25> cents positive.
- 12 <a positive balance of> <12> euro and <25> cents.

2.2.1.5. Negative scheme (N)

- 1 minus <12> euro <25>.
- 2 <12> euro <25> negative.
- 3 <a negative balance of > <12> euro <25>.
- 4 minus <12> euro <25> cents.
- 5 <12> euro <25> cents negative.
- 6 <a negative balance of > <12> euro <25> cents.
- 7 minus <12> euro and <25> cents.
- 8 <12> euro and <25> cents negative.
- 9 <a negative balance of> <12> euro and <25> cents.

2.2.2. VXML example

```
<?xml version='1.0'?>
<vxml version="2.0">
  <form id="main">
    <var name="mpfUrl"   expr="'http://localhost:8080/apfv1_2_0/mpf.wav'"/>
    <var name="baseurl"  expr="'http://localhost:8080/apftest/prompts'"/>
    <var name="currency" expr="'eur'"/>
    <var name="language" expr="'gb'"/>
    <var name="finalPhrase"  expr="'true'"/>
    <var name="mpfString"    expr="mpfUrl + '?baseurl=' + baseurl + '&currency=' +
      currency + '&language=' + language + '&finalPhrase=' + finalPhrase"/>

    <field name="balance" type="currency">
      <prompt>
        Enter a balance
      </prompt>
      <filled>
        <prompt>
          The balance you have entered is:
          <audio expr="mpfString + '&balance=-' + balance"/>
        </prompt>
        <goto nextitem="balance"/>
      </filled>
    </field>
  </form>
</vxml>
```

2.3. dpf (Date Pronunciation Function)

Pronounces a date. The Apf application checks if there is a prompt present for the year (i.e. if the year is 1985 it will check for 1985.wav). If the file is not present, it will concatenate the year with 19.wav and 85.wav

Parameter	Description	Required	Comment
baseUrl	Base path to the wave (.wav) files	yes	http://localhost:8080/myapp/prompts
language	[<country>/]<language>	yes	Example : ch/de In this case, the rules for the function will be german (de) rules, but the prompts must be found in <basePath>/ch/de Country: The country is optional. If not present, the country and language will be the same. Language: Language in 2 digits, nl,NL, GB, gb, DE, de etc. see <i>Currently supported languages</i>
dateValue	date to pronounce	yes	
dateFormat	The format in witch dateValue is offered	yes	Year = yyyy or yy Month = mm Day = dd i.e. yyyyymmdd
pronunciation	How the date must be pronounced	no	Year = yyyy or yy Month = mm Day = dd Day in week = w i.e. wddmyyyy example: 20070512 will be pronounced as Saturday, the 12 th of may 2007.
finalPhrase	Whether the last item of the number must be pronounced with end intonation or not	yes	true or false

2.3.1. VXML example

```
<?xml version='1.0'?>
<vxml version="2.0">
  <form id="main">
    <field name="dateval" type="digits">
      <prompt>
        Enter a date
      </prompt>
      <filled>
        <prompt>
          The date you have entered is:
        <audio
          expr="'http://localhost:8080/apfv1_2_0/dpf.wav?baseUrl=http://localhost:8080/apftest/prompts&language=nl&&dateFormat=ddmmyyy&pronunciation=wddmmyyy&dateValue=' + dateval +
            '&finalPhrase=true'"/>
        </prompt>
      </filled>
    <error>
      <prompt> The date is not correct, please try again.</prompt>
      <clear namelist="dateval"/>
      <reprompt/>
    </error>
  </field>
</form>
</vxml>
```

2.4. tpf (Time Pronunciation Function)

Pronounces a time.

Parameter	Description	Required	Comment
baseUrl	Base path to the wave (.wav) files	yes	http://localhost:8080/myapp/prompts
Language	[<country>/]<language>	yes	<p>Example : ch/de In this case, the rules for the function will be german (de) rules, but the prompts must be found in <basePath>/ch/de</p> <p>Country: The country is optional. If not present, the country and language will be the same.</p> <p>Language: Language in 2 digits, nl,NL, GB, gb, DE, de etc. see <i>Currently supported languages</i></p>
timeValue	Time to pronounce	yes	Must be 4 or 6 digits
timeFormat	The format in witch timeValue is offered	yes	hhmm or hhhmss
pronunciation	How the time must be pronounced	no	hhmm or hhhmss
finalPhrase	Whether the last item of the number must be pronounced with end intonation or not	yes	true or false

2.4.1. VXML example

```
<?xml version='1.0'?>
<vxml version="2.0">
  <form id="main">
    <field name="timeval" type="digits">
      <prompt>
        Enter a time
      </prompt>
      <filled>
        <prompt>
          The time you have entered is:
        <audio
          expr="'http://localhost:8080/apfv1_2_0/tpf.wav?baseurl=http://localhost:8080/apftest/prompts&language=uk/en&timeFormat=hmm&pronunciation=hmm&timeValue=' + timeval +
          '&finalPhrase=true'"/>
        </prompt>
      </filled>
    <error>
      <prompt> The time is not correct, please try again.</prompt>
      <clear namelist="timeval"/>
      <reprompt/>
    </error>
  </field>
</form>
</vxml>
```

2.5. nspf (Number Solo Pronunciation Function)

Pronounces a number digit by digit. This function can be used to pronounce phone numbers.

Parameter	Description	Required	Comment
baseUrl	Base path to the wave (.wav) files	yes	http://localhost:8080/myapp/prompts
language	[<country>/]<language>	yes	<p>Example : ch/de In this case, the rules for the function will be german (de) rules, but the prompts must be found in <basePath>/ch/de</p> <p>Country: The country is optional. If not present, the country and language will be the same.</p> <p>Language: Language in 2 digits, nl,NL, GB, gb, DE, de etc. <i>see Currently supported languages</i></p>
number	Number to pronounce	Yes	Each digit must be between 0-9 I.e.: 057684311
finalPhrase	Whether the last item of the number must be pronounced with end intonation or not	yes	true or false

2.5.1. VXML example

```
<?xml version='1.0'?>
<vxml version="2.0">
  <form id="main">
    <field name="number" type="digits">
      <prompt>
        Enter a number
      </prompt>
      <filled>
        <prompt>
          The number you have entered is:
        <audio
          expr="'http://localhost:8080/apfv1_2_0/nspf.wav?baseurl=http://localhost:8080/apftest/prompts&language=uk/en&number=' + number + '&finalPhrase=true'"/>
        </prompt>
      </filled>
      <error>
        <prompt> The number is not correct, please try again.</prompt>
        <clear namelist="number"/>
        <reprompt/>
      </error>
    </field>
  </form>
</vxml>
```

3. Configuration

3.1. apf.properties file

Most of the time, it is best practice to record numbers from zero till 100, but sometimes these prompts are not available, or the language allows them to concatenate them easily. Also, some projects will have thousands recorded from 1002 till 9000, and some have not. Therefore an apf.properties file can be created in the baseUrl path. If the file does not exist, the Apf Service will use the defaults.

The following properties can be set:

<i>property</i>	<i>type</i>	<i>value</i>	<i>default</i>
numbersRecordedFrom	int	0 - 100	0
numbersRecordedTill	int	0 - 100	100
thousandsRecorded	boolean	true/false	true

4. Prompt lists

4.1. Cardinals

Prompt	Text:
0000	0
0001	1
0002	2
...	...
0098	98
0099	99
0100	100
0200	200
0300	300
0400	400
0500	500
0600	600
0700	700
0800	800
0900	900
hundred	100 (plural)
onehundred	100 (singular)
thousand	1000 (plural)
onethousand	1000 (singular)
and	And
1002	1002
1003	1003
...	...
xxxx	xxxx

Note: the numbers 20 till 99 and thousands (1002 and above) are not required.

4.2. Currency

The currency prompts should be recorded for singular, plural and the applicable cases, which can vary per language. The singular nominative case (most common) is called <currency code>.wav. The other prompts should have more specific names, as shown in the following table:

Case	Prompt for the unit	Prompts for the mantissa	Example
Singular nominative	<CUR>.wav	<CUR>cent.wav	eur.wav, eurcent.wav
Plural nominative	<CUR>nomplural.wav	<CUR>nompluralcent.wav	eurnomplural.wav, eurnompluralcent.wav
Singular genitive	<CUR>gensingular.wav	<CUR>gensingularcent.wav	eurgensingular.wav, eurgensingularcent.wav
Plural genitive	<CUR>genplural.wav	<CUR>genpluralcent.wav	eurgenplural.wav, eurgenpluralcent.wav

Also, if 'and' should be pronounced after the currency and before the mantissa, add the and after the case, i.e. :
eurnompluraland.wav

4.3. mon (year, month, day in week, time)

No:	Text:
0011	At
0012	On
0201	January
0202	February
0203	March
0204	April
0205	May
0206	June
0207	July
0208	August
0209	September
0210	October
0211	November
0212	December
1201	Sunday
1202	Monday
1203	Tuesday
1204	Wednesday
1205	Thursday
1206	Friday
1207	Saturday
1900	The year 1900, till...
...	...
xxxx	Whatever year is recorded

4.4. ordinals

No:	Text:
0001	...the first of...
0002	...the second of...
0003	...the third of...
0004	... the fourth of ...

0030	... the thirtieth of ...
0031	... the thirty-first of ...

The *nma* directory (prompts with final intonation) is identical to *nmn*, except there are no *date* and *ordinals* subdirectories.

5. Currently supported languages

<i>Language</i>	<i>Code</i>
Dutch	NL, nl
English	GB, gb, EN, en
German	DE, de
French	FR, fr
Russian	RU, ru
Latvenian	LV, lv
Lithuanian	LT, lt
Estonian	EE, ee
Russian	RU, ru
Lithuanian	LT,lt
Latvian	LV,lv
Estonian	EE, ee
Swedish	SV, sv
Danish	DA,da
Luxembourgish	LB,lb
Slovenian	SL, sl
Norwegian	NO,no
Croatian	HR, hr

6. Currently supported currencies

<i>Currency</i>	<i>code</i>
Euro	EUR, eur
US dollar	USD, usd
United Kingdom, pounds	GBP, gbp
Estonia, Krooni	EEK, eek
Latvia, Lati	LVL, lvi
Lithuania, Litai	LTL, ltl
Sweden, Kronor	SEK, sek
Norway, Kroner	NOK, nok
Russia, Rubles	RUB, rub
Croatia, Kuna	HRK, hrk