

# Loquendo ASR

## AUTOMATIC SPEECH RECOGNITION



*Loquendo ASR is the next-generation speech recognition technology for speech-enabled applications. It is speaker-independent and reliably recognizes large-scale vocabulary continuous speech, even in the noisiest environments such as wireless.*

*Loquendo ASR currently powers services that handle millions of calls every day, such as fully automated directory assistance services, voice portals, and automotive applications.*

*Loquendo is the only speech technology vendor that provides a complete product line for servers, mobile, desktop PCs and embedded devices, guaranteeing the same wide range of languages and the same accuracy and performance in all these environments.*

### The Benefits to You...

Loquendo ASR gives integrators the freedom to create services that are user-friendly and as complex as they want them to be in terms of vocabulary size, interaction flexibility and number of languages. Loquendo ASR perfectly fits the requirements of each and every application scenario - however complex.

- **Broad Vocabulary & Flexible Recognition** – recognizes up to 1,000,000 words; supports isolated and continuous speech.
  - **Highly Accurate Speech Recognition** – thanks to integration of neural networks and hidden Markov models, and detailed acoustic-phonetic units trained on large speech corpora.
  - **Extended Standards Support** – optimized for VoiceXML applications; complete grammar standards support, both W3C SRGS 1.0 and SISR 1.0.
  - **Highly Accurate Phonetic Transcribers** – specialized for each language (also used in acclaimed Loquendo TTS).
- **High Efficiency** – low-computational power requirements enable a large number of recognition channels to run simultaneously, both with small and large vocabularies.
  - **Rapidly Extensible to new languages** – the methodology that has been tuned for our wide range of languages is rapidly extended to any other.
  - **Powers Loquendo Speaker Verification** technology.

### Simple Yet Powerful Technology...

A complete set of **simple and powerful features** guarantees truly robust speech technology, enabling:

- Improved *barge-in capability* to guarantee high reactivity and robustness to noise and background speech.
- A new patented speech enhancement method for improved recognition performances in *noisy conditions*.
- A *flexible rejection mechanism* which identifies any linguistic expressions that are not acceptable within a specific domain.
- *Dialogue-flow management* which is achieved through confidence values provided for all the *Nbest hypotheses* returned – on a sentence-by-sentence & word-by-word basis.
- *Garbage rules* definition to match arbitrary spoken sequences not modeled by the grammar.

A sophisticated **Speech Assistant Toolkit** guarantees the rapid and efficient definition of Recognition Objects (ROs) and Recognition Packages, such as Grammar ROs and Language Modeling ROs. In “unpredictable” situations, ROs can be created, stored and deleted “on the fly”.

**Significant memory requirement reduction:** ROs can be both *permanent* (and therefore shared by all recognition channels) and *dynamic* (i.e. loaded run-time when required and discarded once they have been used).

Loquendo ASR also provides:

- A **re-usable built-in grammar library** for each language (e.g. date, time, currency, phone numbers, etc.).
- **Phonetic segmentation**, which includes the phonetic representation and related time-stamps for each phoneme within a sentence. This is often a prerequisite, especially in avatar animation.



## ASR Tuning Tools

Loquendo ASR provides users with a tool package that automatically analyzes data collected in the field to improve service performance, including:

- **Phonetic Learning** – which automatically analyzes application data to identify frequent formulations that have not been covered and additional pronunciation variants, to improve a speech recognition grammar.
- **Acoustic Model Adaptation** – further increases recognition performance by using audio material recorded in the field (environment, speaker, channel adaptation), where a vocal application is used in a particular context.

## Loquendo ASR - Technical Specifications

<b>Main Features</b>	<ul style="list-style-type: none"> <li>• Speaker Independent</li> <li>• Open Vocabulary</li> <li>• Noise robustness (e.g. in-car, wireless, etc.)</li> <li>• Optimized for Telephonic Speech</li> </ul>
<b>Basic Technology</b>	A combination of Neural Networks and Continuous Density Hidden Markov Models
<b>Configurable Recognition Modalities</b>	<ul style="list-style-type: none"> <li>• Grammar based</li> <li>• Continuous Speech Recognition with Statistical Language Modeling</li> <li>• Free or Forced Phonetic Decoding</li> </ul>
<b>Key Features</b>	<ul style="list-style-type: none"> <li>• N-Best Decoding</li> <li>• Confidence Scores at sentence and word level</li> <li>• Tunable Voice Detection sensitivity</li> <li>• Improved Barge-In functionalities</li> <li>• Speech Complete/Incomplete Timeout</li> <li>• Garbage rules</li> <li>• Grammar handling and fast grammar compilation on the fly</li> <li>• Re-usable Built-in grammar library</li> <li>• Multilingual grammars</li> <li>• Voice enrolled grammars</li> <li>• Natural Language Processing</li> <li>• Optimized for VoiceXML applications</li> <li>• Loquendo Speaker Verification</li> <li>• Word spotting plug-in</li> </ul>
<b>Tuning Tools</b>	<ul style="list-style-type: none"> <li>• Phonetic Learning</li> <li>• Acoustic Model Adaptation</li> </ul>
<b>Supported Languages</b>	American English, Canadian French, Brazilian Portuguese, American Spanish, Argentinian Spanish, Chilean Spanish, Mexican Spanish, British English, Castilian Spanish, Catalan, Valencian, Galician, Dutch, French, German, Greek, Italian, Polish, Portuguese, Swedish, Finnish, Danish, Turkish, Russian
<b>Grammar Formalisms</b>	<ul style="list-style-type: none"> <li>• JSGF (Java Speech Grammar Format)</li> <li>• W3C SRGS 1.0 (XML and ABNF Form) + SISR 1.0</li> </ul>
<b>OS Supported</b>	MS Windows (XP, Vista, Server 2003, Server 2008*), Red Hat Enterprise Linux (3, 4, 5*), SUSE Linux 10.0, CentOS 5.2. * also available for 64 bit version
<b>Interfaces</b>	<ul style="list-style-type: none"> <li>• Loquendo API (C/C++)</li> <li>• Intel Dialogic Audio Source support</li> <li>• DSR support</li> <li>• Java</li> </ul>
<b>CPU Requirements</b>	<ul style="list-style-type: none"> <li>• Connected Digits Recognition: 80 channels on an Intel Pentium 3.2 GHz CPU</li> <li>• Grammar with 10,000 words: 20 channels on an Intel Pentium IV 3.2 GHz CPU</li> </ul>
<b>Memory Requirements</b>	<ul style="list-style-type: none"> <li>• 15 MB per language shared among channels</li> <li>• Few MB per channel depending on the recognition task (e.g. 5 MB for Connected Digits Recognition, 15 MB for a grammar with 10.000 words)</li> </ul>

For Network/Telephony solutions see the **Loquendo MRCP Server** brochure. For Embedded solutions see the **Loquendo Embedded** brochure. To find out how Loquendo ASR can position your company for success, please visit [www.loquendo.com](http://www.loquendo.com) and try our interactive TTS demo.

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