

# Components

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## Overview

The Toolkit is a distributed system of many components which work in sync with each other. These components are categorized into modules, tools, libraries and 3rd party software.

- **Modules** are run-time components essential to the functioning of the Toolkit; including perception, speech recognition, natural language processing, nonverbal behavior, animation, rendering.
- **Tools** assist in configuring, running and modifying the Toolkit.
- **Libraries** are the API's and frameworks used by the modules and tools (e.g., messaging API, threading, etc.)
- **3rd party software** are components developed outside of ICT which are essential for providing a proper framework for the Toolkit to run.

## Modules

- [AcquireSpeech Client](#)
- [MultiSense](#)
- [NonVerbal Behavior Generator](#)
- [NPCEditor](#)
- [Ogre](#)
- [PocketSphinx Wrapper](#)
- [Rapport](#)
- [SmartBody](#)
- [Text To Speech Interface](#)
- [vhtoolkitUnity](#)
- [Watson](#)

## Tools

- [Installer](#)
- [Launcher](#)
- [Logger](#)
- [SmartBody Monitor](#)

## Libraries

- [ActiveMQ](#)
- [Bonebus](#)
- [Boost](#)
- [OgreSDK](#)
- [Pthreads](#)
- [VHCL](#)
- [VHMsg](#)
- [WSP](#)
- [Xerces-c](#)

## 3rd Party Software Requirements

This section lists all the 3rd party software needed to run the Toolkit. This software is bundled with the Toolkit.

### Users

- .NET Framework 3.5 SP1 Redistributable (included with the Toolkit installers, external [link](#) if needed)
- DirectX Redistributable (August 2009) (included with the Toolkit installers, external [link](#) if needed)
- [ActiveMQ](#) Server 5.8.0.0 (included with the Toolkit installers)

## Developers

- All user requirements (above)
- Microsoft Visual Studio 2010 (optional, but preferred)
- Unity (<http://unity3d.com/unity/download/>).

## 3rd Party Alternatives

Some of the Toolkit components are mere proof-of-concepts rather than state-of-the-art solutions. This section lists alternatives to some of these components.

### Speech Recognition

Conversational speech recognizers often need to be trained for use with specific domains. Untrained recognizers may perform poorly. Some recognizer options are:

- Sonic, to which the AcquireSpeech client can connect, [link](#)
- The Toolkit has been integrated with [PocketSphinx](#), but as of yet not optimized for performance.
- Dragon, not integrated, [link](#)

If you are interested in the [USC Signal Analysis and Interpretation Laboratory](#) providing you with custom speech models for Sonic, please [contact us](#).

### Text To Speech

The Toolkit uses **MS SAPI** as a TTS interface and any SAPI compatible voice can be used with the Toolkit. To use a new voice download, install it, and change the character's voice ID. See the [FAQ](#) for details.

Some free SAPI voices are found here:

- <http://www.bytecool.com/voices.htm>

ATT Natural Voice is also compatible with SAPI, but requires you to buy voices. [link](#)

Unfortunately, SAPI is not very well maintained by Microsoft; Windows XP by default contains a very outdated voice, Sam, and the installation of new voices on XP 64, Vista, and Windows 7 is either not working or requires registry hacks.

The following commercial Text To Speech engines offer higher quality voices, but will require purchasing or otherwise licensing a voice directly from the developer:

- [Cereproc's Cerevoice](#), (free research licenses are available to academic institutions for research purposes)
- [Cepstral](#)

Software interfacing from the toolkit to these engines is available in the [SmartBody SourceForge repository](#).

The toolkit is also integrated with the **Festival text to speech engine**. Currently the toolkit comes packaged with free diphone voices.

Festival offers other voices with better quality but might require licensing.

### Renderer

[SmartBody](#) has been integrated with the following renderers:

- [Unity](#) available as part of the toolkit.
- [Ogre](#), available as part of the toolkit
- [Gamebryo](#)
- [Unreal Tournament 2004](#), requires license
- [Panda 3D](#), available in [SmartBody SourceForge repository](#)

Since SmartBody is open source, as a developer you can integrate it with other renderers.