

## White Paper: Anatomy of a Speech System

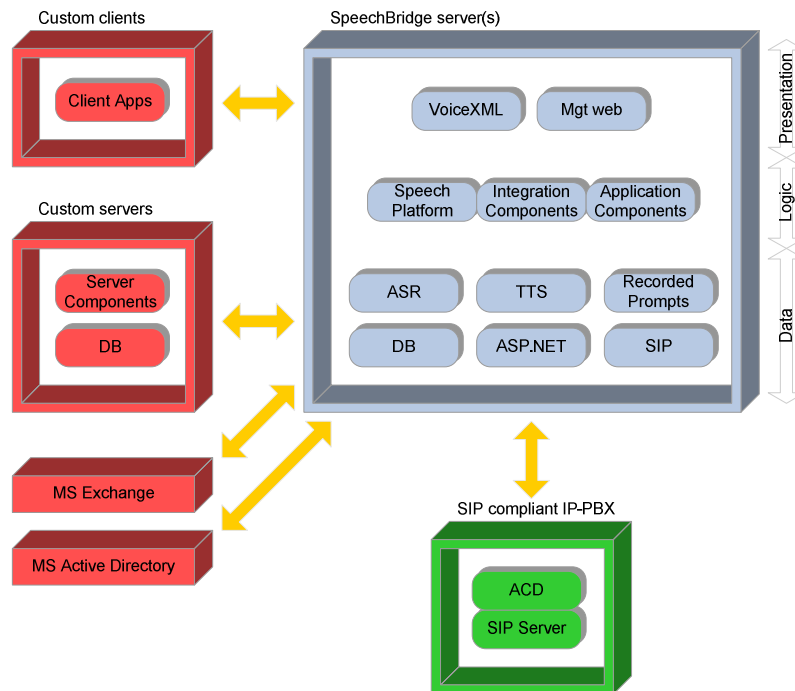
Giving your employees and customers access to information through simple, straight forward conversational commands 24/7 can greatly improve productivity and reduce operating costs throughout your organization. Speech driven IVRs, auto-attendants, mobile e-mail access, automated bill pay and service call scheduling applications have already given a competitive edge to the companies that have implemented them. SpeechBridge™ solutions offer an attractive ROI to organizations looking to cut costs, increase worker productivity and improve their customer self service options.

"SpeechBridge was very easy to install and deploy - before we knew it we had our own personalized speech-attendant routing our callers and an excellent speech-enabled application development platform in our hands."

- Alexandre Cox, Project Lead, VoiceForge

## Anatomy of a Speech System

From a high level perspective, a speech system is typically comprised of three major functional groups: the telephony platform ([IP-PBX](#)), the speech platform (SpeechBridge), and one or more in-house applications for data collection and other functions.



**Figure 1 - Speech System Components**

**Figure 1**, the blue boxes and arrows are components of and protocols/integration supported by the SpeechBridge™ server out of the box.

## Speech Platform

The SpeechBridge™ platform includes all of the pieces necessary for a complete enterprise speech solution in an [n-tiered architecture](#) for a scalable, highly available solution that can grow with an organization as they implement speech access into their daily operations:

- **Data Tier**
  - **Automatic Speech Recognizer (ASR)** – Converts speech into text, also called speech recognition engine.
  - **Text-To-Speech engine (TTS)** – Converts text to audio for playback to the caller.
  - **Recorded Prompts** – Pre-recorded audio for playback to the caller.
  - **Database** – For storing system data, user configuration info, etc.
  - **Web server** – The web server used to host system management tools and end-user applications
  - **Session Initiation Protocol (SIP) User Agents (UA)** – Connects to the IP-PBX to process audio and signaling information.
  
- **Logic Tier**

- **Speech Platform** – Coordinates the processing of multiple audio streams to and from the PBX, and drives the conversation with the caller by following the logic described in the VoiceXML code and integration components.
  - **Integration Components** – These components are used by the speech applications to talk to external data-sources and servers. Supported are components that can be written in C#, Java, or Visual Basic for Linux, or in any of the supported languages when run on Windows (including C#, Java, Visual Basic, C++, Python, etc.)
  - **Application Components** – These are plug-in components that perform any custom logic needed by the speech application.
- **Presentation Tier**
    - **VoiceXML Code** – An XML language standard that simplifies the development of speech recognition applications.
    - **Management Website** – This is an internal website for all administrative and provisioning operations performed on the SpeechBridge™ platform.

## Telephony

SpeechBridge™ was designed from the ground up to be a seamless enhancement to an organization's telephony platform. Assuming that your IP-PBX fully supports the [SIP](#) and related standards, all of the enterprise applications included with SpeechBridge™ will interconnect with the phone system out of the box. Otherwise custom integration work or additional telephony hardware (i.e. a SIP gateway) may be needed.

Integration with an [Automatic Call Distributor](#) (ACD) within an IP-PBX will vary depending on the vendor, as the industry has not settled upon any particular standard.

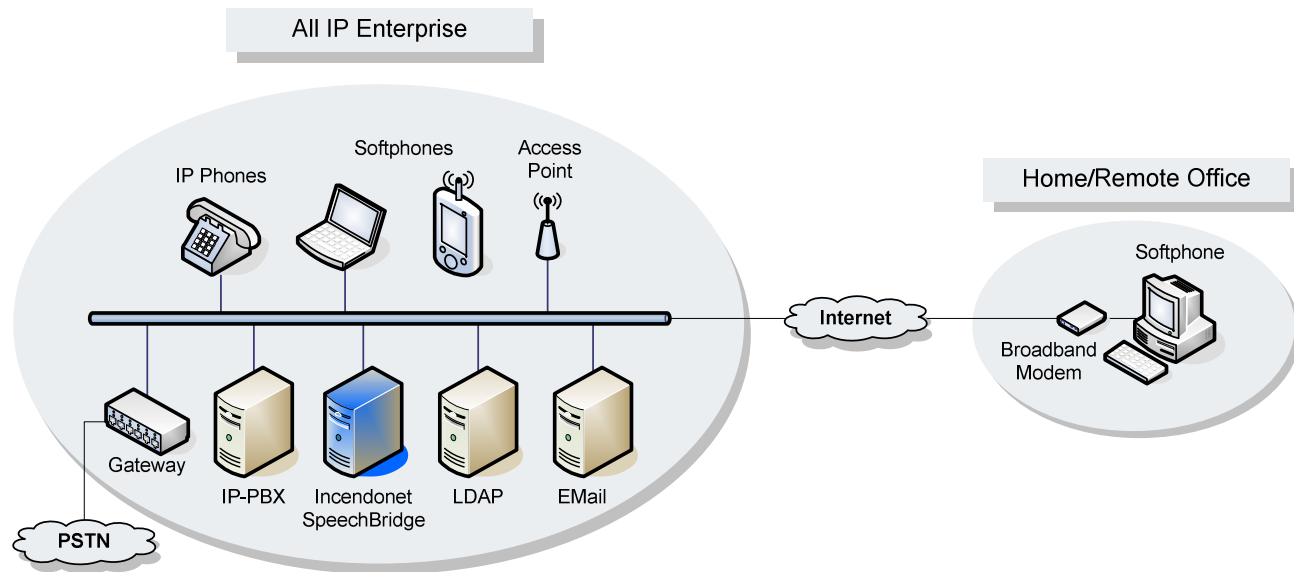
## End User Applications

SpeechBridge™ includes a suite of VoiceXML based applications. Our Auto-attendant, E-mail Review and Calendaring applications will allow your organization to begin realizing an immediate ROI, while analysis and development work is underway to further optimize your business with speech access.

- **Auto-Attendant:** Improve and accelerate service for your customers and speed up your employees collaboration by allowing them to speak the name of the department or individual they wish to reach. No more "dial by name" pain – just say the name or department.
- **E-mail Review:** Expand secure, mobile e-mail access for your employees with the ability to pick up any phone and speak simple commands to access enterprise e-mail servers and review and reply to e-mails.
- **Calendaring:** Your employees can speak simple voice commands to access their calendars to review, schedule, and accept or reject meeting requests, all from any phone.

## Typical SpeechBridge™ Deployment

The SpeechBridge™ solution works with existing enterprise systems and connects you and your customers to core enterprise applications through simple, spoken requests. SpeechBridge can be deployed in both pure IP and traditional telephony network environments.



## SpeechBridge™ Key Features

The SpeechBridge™ platform includes all of the pieces necessary for a complete enterprise speech solution.

Feature	Benefit
SIP Native	Developed from the ground up to offer a standards based, native SIP, VoIP network appliance and will work with any SIP based VoIP solution.
Flexible Directory Options	The SpeechBridge™ applications can be automatically provisioned via LDAP, MS Active Directory, XML/CSV files, or web entry.
Complete Voice Platform	SpeechBridge™ supports a wide range of voice applications and as your organization automates daily business tasks you increase the ROI of your VoIP network investments.
Tight MS Exchange Integration	Seamless and secure integration with Exchange. Applications are ready to go out of the box with minimal web based administration.
Automatic VoiceXML Generation	When changes are made to your directory, the network appliance automatically generates VoiceXML for the SpeechBridge™ applications.
Instant ROI Generating Applications	With Auto-Attendant, E-mail Access, and Calendaring ready to use, your organization will begin realizing ROI from day one.
Self-Configuring	Patent pending technology simplifies installation, set-up and administration.