



VoiceXML

MESSAGEmanager Solutions
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About VoiceXML

Faced with steadily rising costs and pressure to improve the speed and efficiency of business processes, organisations are searching for more efficient ways to deliver consistently outstanding service.

Since the internet emerged as a stage on which to interact with customers, many businesses invested heavily in web self-service applications. While some users access information and conduct transactions over the web, the majority of transactions continue to take place over the telephone - three telephone users for every one person using the internet. Customers are also more likely to call a toll free number than use a web self-service application.

With over 1.5 billion telephones and over 450 million mobile devices worldwide, the number of telephone users continually growing and 80% of business being conducted over the telephone, the challenge is to leverage corporate investments in web and back office systems for the 92% of customers that still use the telephone.

Customer self-service Web portals and speech or touch-tone IVR applications are important touch points for customers and are key components of an overall customer contact strategy. Common sense suggests they should be managed together. In practice they are separate from each other, technically and operationally.

Historically Interactive Voice Response (IVR) systems have been proprietary platforms, requiring high priced experts to develop and support with non standard interfaces to back end systems.

The benefits of developing in VoiceXML include:

- Deliver web content and services through the telephone
- Leverage existing Internet infrastructure and skill-sets
- Ensure portability across implementation platforms
- Decrease the level of expertise required to create voice applications
- Enable rapid voice application development, similar to HTML for the web
- Provide "Voice View" for web content

VoiceXML

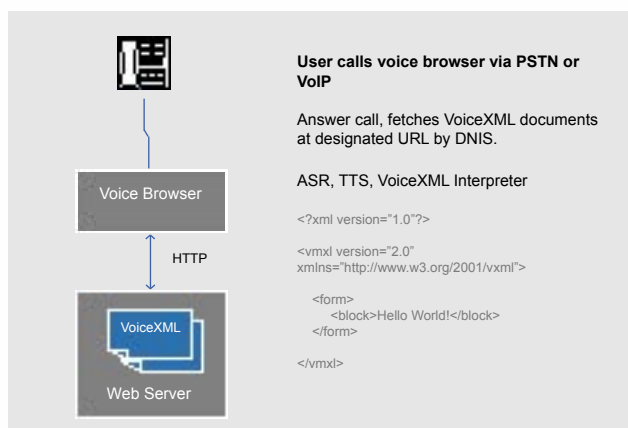
Instead of a keyboard and a mouse, VoiceXML lets users access the web via speech recognition and touch tone for input and prerecorded audio and text to speech for output.

VoiceXML is a mark-up language for voice applications based on eXtensible Mark-up Language (XML) ie a Web-based mark-up language, designed for establishing dialogs with callers over the telephone providing voice access to web content and services using speech recognition, text-to-speech, and audio prompts.

VoiceXML is a mature standard first published in 1999. The World Wide Web Consortium (W3C) Voice XML 2.0 specification is based on many years of research and development by AT&T, IBM, Lucent Technologies and Motorola. The 550 organisations that comprise the VoiceXML Forum have submitted VoiceXML to the W3C for consideration as a worldwide standard for speech.

VoiceXML allows interaction between a caller on a telephone and a Web or business Server. Communication between voice applications and the VoiceXML interpreter is similar to the desktop web browser model. VoiceXML makes the speech platform a browser that communicates with your Web application over HTTP - no different than Internet Explorer. The "grammar", which includes all the words and phrases that can be recognised, define the "richness" of a caller's experience. VoiceXML uses XML "tags" to reference a grammar and describe the call flow, i.e., how the dialog proceeds between a caller and the automated system.

As the VoiceXML standard includes an agreed upon, simple and straight forward way for an application to interact with a speech recognition platform the only difference between what the Web would show and what VoiceXML would tell a caller is limited to presentation.



VoiceXML bridges the voice and data networks. It takes advantage of Web infrastructure to deliver web content to telephone callers.

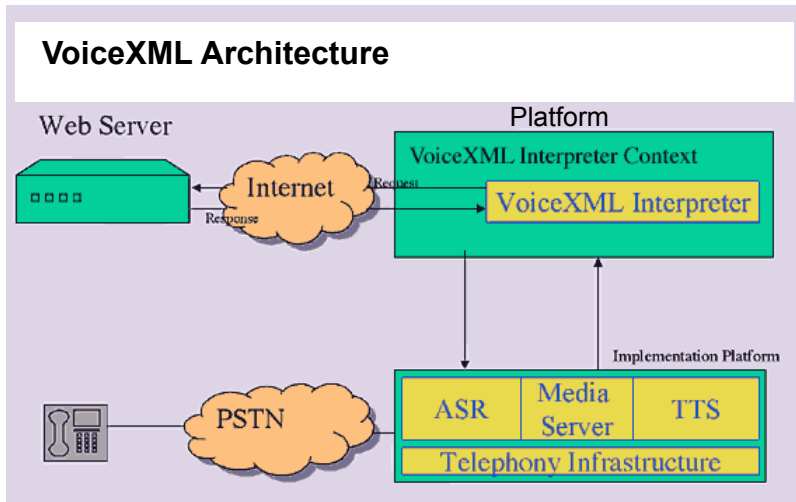
This architecture enables organisations control of voice application development while reusing existing components of the Web interface to back end systems.

VoiceXML Architecture

VoiceXML is an XML data type definition (DTD) defined specifically for voice applications. The VoiceXML Specification document details all the tags that are part of this DTD. The specification also deals with the architectural model for VoiceXML implementations, from interpretation algorithms, and the scope of VoiceXML.

The graphic shows the architectural model in a VoiceXML platform. There are three components: a web server, the VoiceXML interpreter context, and the implementation platform. The web server in the graphic can be any web server on the Internet. The interpreter context contains the VoiceXML interpreter, which is responsible for interpreting VoiceXML code. The interpreter context provides all supported functions that are necessary for the interpreter.

The VoiceXML interpreter sends parameter values to the web server as part of the request and it receives a VoiceXML document as the response. The web server receives requests and sends responses back to the interpreter.



The VoiceXML interpreter and the VoiceXML interpreter context work with an implementation platform that has other infrastructure components such as a telephony switch, voice recognition software, and a speech synthesis engine (TTS).

This implementation platform is responsible for connecting to the Public Switched Telephone Network (PSTN), performing voice recognition, playing audio files, and other supporting functions.

Since the implementation platform provides voice recognition capabilities, the details regarding voice recognition are hidden from VoiceXML.

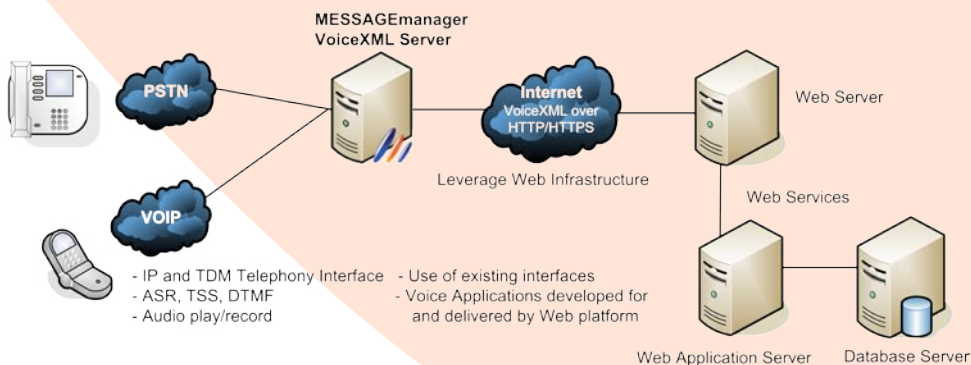
VoiceXML Industry-Standard Language

VoiceXML enables voice applications to be written in an industry-standard language rather than proprietary APIs. The advantage being that scripts developed for one VoiceXML platform can be easily placed on a variety of VoiceXML platforms.

VoiceXML uses XML 'tags' to reference and describe the call flow, such as <audio> (to play an audio file) and <disconnect> (to end a user's call). The script controls how the dialog with the caller proceeds - by DTMF or Speech Recognition, or both, using recorded prompts or text-to-speech, or both. A script can hand over the dialog to another script, or call an operator and transfer the call. VoiceXML includes the ability to execute JavaScript providing flexible and efficient access to business applications such as back-end databases, Web Services, or COM components.

Applications implemented with VoiceXML are less costly and less complex to develop, manage and maintain as they can be easily updated by internal IT staff with HTML skills.

VoiceXML has wide and growing industry uptake. There are thousands of deployed, commercial VoiceXML voice applications running worldwide on platforms from nearly 100 vendors such as MESSAGEmanager Solutions. These applications serve all industries, and not just their call centers. VoiceXML applications range in size and complexity, from small, departmental applications to staggeringly huge ones like the North American Toll-Free Directory Assistance (1-800-555-1212). People not only can reach these applications from any of the world's 2.5 billion phones, but also from growing numbers of two-way radios, automotive systems, browser plug-ins, PC-based softphones, and other devices.



How it Works

1. The caller dials a phone number which connects to MESSAGEmanager VoiceXML Server.
2. MESSAGEmanager looks up the dialed number (DNIS) and the caller's number in its database to identify a suitable VoiceXML script to handle the call. For example, the database may specify that any calls dialled to a number ending in 300 through to 309 are to be handled by the script "TechnicalSupport.vxml".
MESSAGEmanager obtains the script from a local hard drive, a file Server, or a web Server, according to the full path specified in the database. If the script has been used recently it will probably be in the MESSAGEmanager cache, in which case no external access is necessary.
3. MESSAGEmanager conducts the call as directed by the VoiceXML script. The script may specify audio or text prompts to be played to the caller, accept DTMF digits transmitted by the caller, record the caller's voice, or listen to the caller and interpret his or her speech.
Depending on the caller's input (DTMF or recognised speech) the script can save information in a database, retrieve information from a database or application Server and speak to the caller, transfer control to a different VoiceXML script, or transfer the call to another phone.
4. When a call is completed either because the caller has hung up or the VoiceXML script has finished and hung up the phone, MESSAGEmanager releases all the resources used by the call, such as telephony hardware, speech recognition licenses, and database connections. The telephony channel is then available for the next call. Distributed Services Architecture.

MESSAGEmanager supports access to multiple applications from any port, i.e., voice ports are not bound to a particular application. Multiple applications can be supported simultaneously according to calling number (ANI), called number (DNIS), line number or date and time.

The architecture of VXML enables organisations to leverage voice resources in their network by enabling the separation of application/service logic from the underlying media resources, thereby facilitating the reuse of these resources for many applications and reducing the need for application specific voice hardware.

MESSAGEmanager supports distributed voice services architecture so that:

- A call can arrive on any port in an array of voice processing platforms.
- With the information provided by the call, the appropriate application is notified so that it can support the requirements needed by the caller.
- There can be many applications, from many different developers, available to support the call.
- Applications no longer run on the voice platform; rather, they are on separate servers, which can be located anywhere, linking over an IP network to the voice platform via VoiceXML.

MESSAGEmanager VoiceXML Server allows organizations to fully realize the benefits of Telephony Self Service. MESSAGEmanager leverages, and easily integrates with, existing industry-standard telephony and IT systems and applications, harnessing the development practices and standards of Web-based technologies enabling organisations to build and deploy IVR and Web applications on a single platform, based on one code base, running on one infrastructure.

Besides a tidy architectural fit, companies are achieving outstanding customer service with flexible, consistent, and integrated access to the wealth of information available on the company web infrastructure whether via telephone or the Web.

A Final Word

Standards such as VoiceXML have revolutionized the deployment of speech applications with some supporting thousands of telephone ports. The usual advantage of standards--portability and availability of developers and packaged applications are only part of the story.

- Most developers confirm VoiceXML is at least three times faster in terms of application development compared to traditional IVR;
- VoiceXML is less expensive than traditional IVR, partly due to the fact that IVR requires a second silo infrastructure from existing Web infrastructure, and VoiceXML does not (think of the costs savings a financial institution can realize from having its Web banking team also manage its IVR application, as opposed to having separate Web banking and IVR banking development teams);
- VoiceXML ease of integration with existing application server infrastructure (i.e., running VoiceXML apps off the same app servers that Web services run off) allows for reuse of e-business investments in a flexible, distributed architecture, rather than on a "big iron" legacy IVR platform seen in the past.



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