



Voice Self-Service Aligns with Web Architectures to Reduce TCO, Increase Flexibility and Ensure Content Consistency

Executive Summary

Although the advantages of voice self-service are reasonably well known, most enterprises have not expanded and standardized this capability. Deployments have focused on a particular line of business or corporate function. Until now, enterprises have been unable to share the type of business logic typical of web applications because of the architectural limitations of voice self-service. These restrictions reduced the return on investment that enterprises could gain by having a company-wide voice self-service infrastructure.

The movement to VoiceXML has revolutionized the voice self-service market and is enabling closer alignment of business content across web and voice self-service. IT departments can now more readily leverage skills across both self-service channels. Customers will benefit from a higher degree of consistency between the two channels.

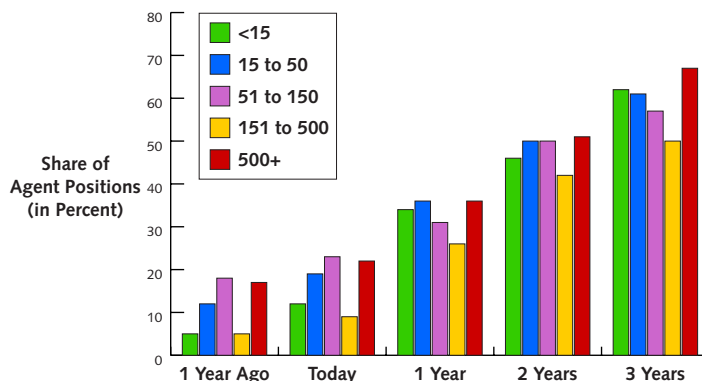
Another critical element simplifying the deployment of voice self-service is the accelerating adoption of VoIP for contact centers (see Exhibit 1). Historically, the integration of voice self-service into contact centers required extensive investments in computer-telephony integration (CTI), carrier services for forwarding calls and expensive professional services. VoIP-based voice self-service systems eliminate expensive circuit-switched hardware, CTI software and expensive specialized professional services required to tie it all together.

To better reflect these important changes, the industry has adopted the term "voice portal." During the dot-com era, this term was used for general-purpose consumer-oriented speech applications that did not fare well. The industry now utilizes this term to express the shift to more specific, customer-service-oriented applications that drive more significant ROI.

Exhibit 1

Contact Center Agent Positions Migrate to VoIP

Source: Yankee Group, 2006



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I. Introduction

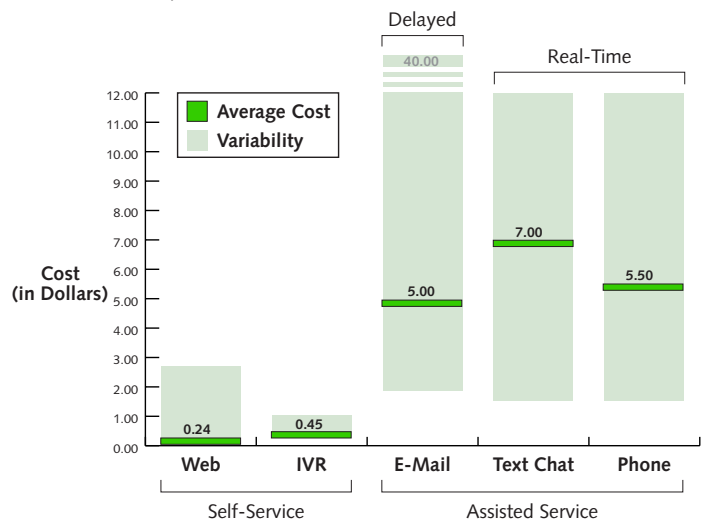
Companies from all vertical industries use voice self-service with touchtone interfaces or speech recognition to automate interactions with customers over the phone. Industries such as retail banking, airlines and utilities benefit from this technology by allowing customers to retrieve information or initiate transactions over the phone. Voice-self service is one of the most popular and cost-effective communications channels for enterprises (see Exhibit 2).

Many enterprises use voice self-service to support customers with 24x7 availability. For example, a major retail consumer products and appliances firm implemented a speech recognition application to enable its customers to locate the nearest store, check for parts and schedule technician repair visits. Many mortgage servicing firms use voice self-service to enable customers to schedule a payment and check balances. In both of these instances, customers can access these services quickly and easily over the phone and around the clock. The payback period for these applications ranges from 3 to 9 months. When applications are properly deployed, they increase customer satisfaction while reducing costs.

By leveraging the architecture of web self-service applications, voice is poised to expand its reach within enterprises. IT resources that develop and maintain business logic for web applications can now be more readily applied to voice.

Exhibit 2
Customer Support Communication Channel Costs

Source: Yankee Group, 2006



II. Barriers to Broader Adoption of Voice Self-Service

Although voice self-service consistently delivers high payback and ROI, many organizations still have not realized the results from implementing them as a company-wide utility. Many IT organizations struggle to manage and expand the use of these systems throughout the enterprise. Yankee Group estimates that 60% to 75% of IT organizations depend on outside, specialized resources to program and maintain their voice self-service systems.

Enterprises tend to view upgrades or modifications to existing applications as expensive, despite the relatively swift ROI. That's because the business logic for a particular transaction must be recoded and separately maintained in the voice self-service system. IT professionals tend to be more comfortable with programming and maintaining corporate web sites.

The following areas of voice self-service initiatives have challenged customer care managers:

- Proprietary application development environment:** Traditional interactive voice response (IVR) and speech systems required that programming be tied to a specific hardware and software platform. This guaranteed vendor lock-in and was the historical norm in the voice self-service industry.
- Network integration complexity:** Traditional circuit-switched-based IVR and speech systems required expensive CTI to properly hand off customer information to the agent desktop in the call center. In addition, individual ports on automatic call distribution (ACD) and IVR systems had to be provisioned for peak traffic periods, thereby increasing cost.
- Use of carrier services added to cost per call:** Many voice self-service applications are utilized to better direct callers to a particular pool of agents. When those agents were in other locations, the systems needed to use carrier services to switch the call from the voice self-service system to the appropriate contact center.

III. The Emergence of the Voice Portal

Two main trends have affected voice self-service and driven the emergence of voice portal technology:

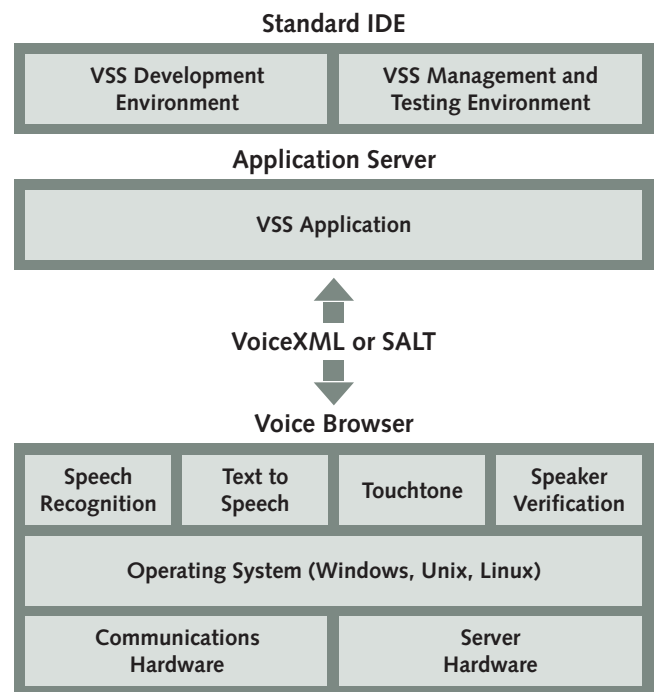
- The convergence of web and voice applications development driven by the VoiceXML standard
- The convergence of voice and data networks using VoIP

Combined, these trends facilitate a much lower TCO for voice self-service and will increase its deployment as a corporate-wide utility.

VoiceXML Aligns Voice Self-Service Application Development with the Web

The typical layering of technology in a voice portal is similar to the evolution of IT systems and their adaptation to a web delivery model. What had been a proprietary technology stack is now broken into the typical three-tier web application delivery model (see Exhibit 3).

Exhibit 3
VoiceXML Standardization on Application Development
Source: Yankee Group, 2006



The VoiceXML standard has driven a revolution in voice self-service and now dominates the market. In examining the evolution toward a more fully web-application-oriented stack, it becomes clear where there are opportunities to leverage standard IT skills for voice self-service systems:

- **Common development environments between web and voice applications:** Voice portals now have embraced more open and web-oriented development environments including Eclipse. Voice development tools such as those available from Audium are now simply plug-ins but adhere to all the common paradigms web developers are familiar with.
- **Integration:** Common software tools such as Open Database Connectivity (ODBC) are readily available to integrate voice portal applications with back-end databases.
- **Portability and reuse of code:** Although the VoiceXML standard does not guarantee complete portability, it comes very close to this ideal. Software components of voice applications can be shared or made available to speed voice self-service application development. This is especially key in expanding the adoption of speech-based applications on voice portals.

Exhibit 4
VUI vs. GUI Development

Source: Yankee Group, 2006

	Graphical User Interface	Voice User Interface
Language	HTML	VoiceXML
Browser Output	Markup formatted text and images	Markup formatted streaming audio, synthesized text or prerecorded audio
Menus	Screen pull-downs	Audio output
User Input	Keyboard or mouse	Touchtone keypad or voice
Field Navigation on a Form	Keyboard or mouse	Touchtone keypad or voice
Data Persistence	Screen display	User's short-term memory
Error Handling	Screen error message using reprompt	Audio error message using reprompt with cascading

The Great Divide: Voice User Interface

The user interface remains one of the most critical and challenging elements to widespread adoption of any technology. IT professionals first struggled to add desktop graphical user interfaces to host-based applications. They faced the challenge once again with the introduction of the web and its unique user interface requirements.

Today, IT professionals struggle to reconcile the inherent differences between a graphical user interface (GUI) and a voice user interface (VUI) (see Exhibit 4).

Voice-based models are more transient than data residing on a computer screen. Additionally, the design skills required for both touchtone and speech recognition applications diverge greatly from the experiences and training IT professionals normally receive. But easy-to-use graphically based development environments have not alleviated the need for a different skill set. This has also been a major factor in the need for recoding business logic for voice-based applications.

VoiceXML provides a richer standard to help IT professionals leverage reusable components to build and maintain applications. This will further expand voice self-service applications from traditional touchtone-based IVR to speech-recognition-based voice portals.

Tuning Is Critical for VUI Performance and Overall ROI of Voice Self-Service

The popular media focuses on consumer frustration with voice self-service. Although millions of transactions are conducted successfully each day across the globe, the public likes to focus on systems that have been poorly designed or maintained that create consumer frustration and annoyance. This makes it even more important for enterprises to ensure they invest in both upfront proper VUI design and ongoing tuning.

In the past, professional services refined and monitored the performance of the VUI. Experts in VUI design would set up and then analyze system logs of detailed consumer interactions to better understand its performance. Enterprises often balked at the expense of such efforts, resulting in systems that were not well tuned and operating well enough to handle a reasonable number of transactions. The lack of a well-performing VUI results in the following customer service issues:

- **Increase in customers contacting the operator:** Because customers expect poor VUI performance, they increasingly opt out of the system directly to a call center agent. Some organizations actually have begun to remove this option, further frustrating callers and eroding their willingness to use the voice self-service system.
- **Lack of proper data gathering:** For transactions that require live agent support, the purpose of voice self-service is to collect information in advance, thereby reducing handle time and improving customer satisfaction. A poor VUI prevents collection of the proper information, placing more of the burden on the agent and creating more customer dissatisfaction.
- **Abandoned calls:** In some cases, prospective customers may get so frustrated that they simply abandon their efforts and try a competitor.

New technologies and services are emerging to help enterprises better investigate VUI performance. Some are capable of linking the analysis of VUI performance with outcome information such as how calls are handled when they go to a live agent. These offerings have incorporated advances in speech recognition software and improved hardware performance to automate more of the tracing and analytical tasks formerly handled by professional services.

Cisco's Customer Interaction Analyzer records and analyzes every voice self-service call. It is offered as a managed service so the enterprise can allocate the hardware expense of recording and analyzing every call among all users of the service. It is designed to work with the Cisco Customer Voice Portal and captures not only the voice self-service interaction but also the live agent portion of the call. This enables deeper analysis of how and what transpired between the VUI and the customer interaction with the agent.

Services such as Cisco's Customer Interaction Analyzer use speech recognition technology to help automate the analysis of conversation patterns to optimize VUI performance. Professional services companies design search criteria that help categorize and group calls for more detailed analysis as they move from voice self-service to live agents. This analysis enables enterprises to do the following in a more cost-effective manner:

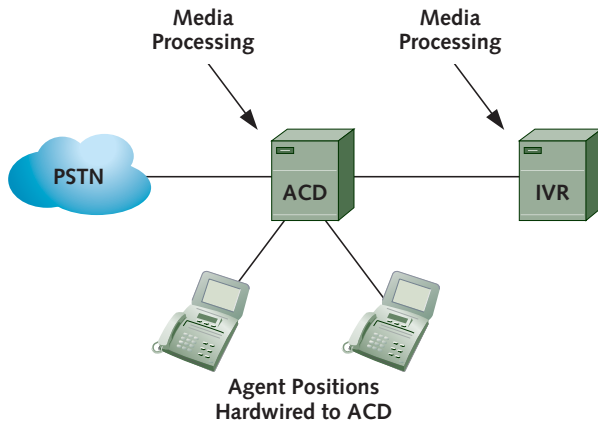
- **Analyze VUI design issues:** As business needs change and language evolves, enterprises need to fine-tune their voice self-service system. By better automating the analysis of VUI design and caller behavior, it is easier and more cost-effective for enterprises to do this frequently—thereby maintaining a high level of customer satisfaction and system utilization.
- **Identify additional VUI enhancements:** Linking the analysis of voice self-service and agent interactions makes it easier to identify new transactions that can be completely automated.
- **Interaction analytics:** By investigating the content of calls, enterprises are better equipped to explore customer issues and concerns. A well-tuned speech analytics system can yield more rapid response to competitors, customer service issues and valuable marketing data.

VoIP Migration Simplifies Deployments and Leverages Corporate WANs

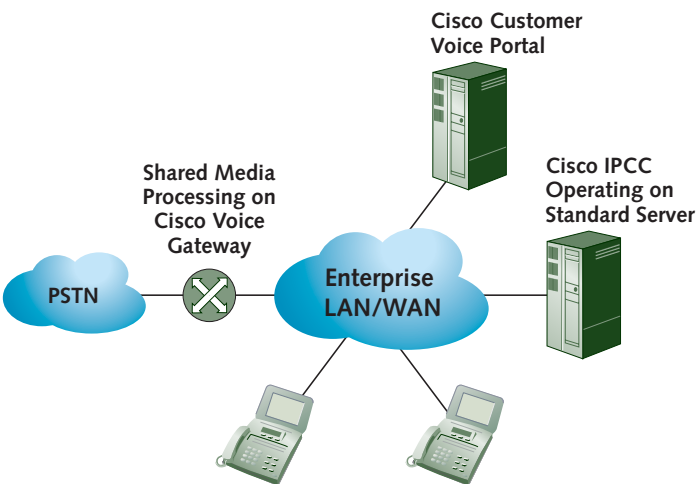
Networking all the components necessary to provide a comprehensive customer support infrastructure requires expensive integration tools, software, professional services and additional services from carriers. Traditional circuit-switched networks used multiple points of translation and protocol conversion to hand off calls between the voice self-service system and the ACD connecting calls to agents. The hardware and software for media processing was closely intertwined with the business logic used to manage customer contact calls. As traffic and business logic changed, this required software changes and reengineering of the physical ports and links in the TDM network (see Exhibit 5 on next page). The physical ports on the ACD and voice self-service system were not shared, which added a layer of complexity and function overlap.

Exhibit 5**Contact Center TDM Architecture**

Source: Yankee Group, 2006

**Exhibit 6****Pure IP-Based Voice Portal Architecture**

Source: Yankee Group, 2006



Moving to an IP-based network for connecting contact center components will eliminate the overlap of media processing between the ACD and voice self-service system. The Cisco Customer Voice Portal architecture allows for separation of media processing and voice self-service system applications logic (see Exhibit 6).

The IP-based Cisco Customer Voice Portal will alleviate cost and increase TCO in a number of areas when integrating voice self-service into a customer support network:

- **Replacement of circuit-switched port hardware with more flexible and cost-effective IP interfaces:** Today, when voice self-service systems integrate with ACDs it requires dedicated circuit-switched port hardware on both systems. Building a system engineered for peak traffic requires provisioning expensive ports on both ends that remain idle most of the time. Moving to VoIP will enable both the ACD server and the Cisco Customer Voice Portal server to share media gateway hardware, thereby reducing complexity and cost and increasing manageability.
- **Inability to extend voice self-service cost-effectively to local branches:** It has been cost-prohibitive for organizations that provide local phone numbers out of a branch to deploy consistent voice self-service to those callers. Cisco Customer Voice Portal applications can be extended over the corporate WAN to media gateways that terminate local numbers in small branches.
- **Elimination of carrier-based transfer charges:** By using the corporate WAN, calls can be moved from the voice self-service system to any contact center agent.
- **Queuing of calls at the network edge:** The voice gateway portion of a Cisco Customer Voice Portal can be operated on media gateways on the edge of the corporate WAN, allowing for treatment and queuing of calls at the network edge. This further optimizes WAN bandwidth. It also dramatically increases the flexibility of routing calls based on changing business requirements.

IV. Conclusions and Recommendations

The Cisco Customer Voice Portal is poised to revolutionize the delivery of voice self-service within enterprises. Standardization on VoiceXML allows for closer alignment of content and business logic with web applications. It also provides a better standard for the development of software components that can be shared or purchased by enterprises to increase the scope of voice self-service applications.

The Cisco Customer Voice Portal is also designed to embrace VoIP technology, thereby reducing TCO and increasing the flexibility of these applications. Routing, queuing and treating calls at the edge of the corporate WAN enables enterprises to support a broader array of customers than in the past.

Recommendations

- **Adopt VoiceXML as a corporate standard.** IT departments are in a better position to support voice self-service systems by applying their web application management skills. Reusable voice self-service components that support VoiceXML are readily available.
- **Develop a plan to migrate existing applications to a corporate utility.** The enterprise will incur increased economies of scale for equipment, software and staffing for voice self-service systems. Although this remains a difficult proposition for enterprises due to organizational differences, it will provide a more flexible and lower cost infrastructure.
- **Implement a corporate-wide utility to justify a larger range of applications.** Enterprises can now address additional applications that they may not have considered in the past due to costs (e.g., internal, employee-facing systems that improve internal productivity).
- **VoIP can help extend voice portal applications to the network edge.** Branches with local numbers can now install media gateways and tap into centralized voice portal applications at a low cost.
- **Review the existing circuit-switched network supporting customer contact for opportunities to reduce cost and increase flexibility.** Voice portals typically front-end calls into the contact center. By eliminating circuit-switched carrier services, enterprises can enhance the business case for moving to VoIP.

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