



Real Time Audio Streaming of Election results: Case Study of an innovative Vaachak based application

- **Solution Highlights:**
 - Application to read-out of election updates posted on the Election Commission website in Hindi and English – *in real time*
 - The first ever solution deployed in India to help read out information in English and Hindi on a website in speech format
 - Uses indigenously designed, India's first Text to Voice software – Vaachak at the core to handle text read out.
 - Allows the Election Commission to cross the digital divide to make it's information available to each and every citizen of India
 - Of immense value to the illiterate and visually/ print impaired who would now be able to hear all the updates in their local language
 - Can serve as a model for all future e-governance initiatives

The Election Commission of India

The Constitution of India has vested in the Election Commission of India (ECI) the superintendence, direction and control of the entire process for conduct of elections to Parliament and Legislature of every State and to the offices of President and Vice-President of India.

The Scenario

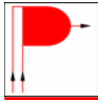
The Election Commission of India (ECI) is aggressively adopting the latest technologies to deliver electoral information to the Indian citizen through many different media. One of the more recent and popular additions has been the Internet through which the ECI communicates electoral information such as details of candidates, political parties, voter information, etc. This medium is also used to publish the election results in real time as they are updated during the counting process. This information is available currently in both English and Hindi on the ECI website: www.eci.gov.in

The Problem

While Internet based information delivery has made information far more accessible than before, almost 50% of India's electorate is unable to access this due to problems of illiteracy and/or visual impairments. Since this same segment also comprises of one of the most active and vibrant faces of Indian democracy, any information initiative would be incomplete if it did not allow access to information by them.

The problem thus transforms into enabling an effective solution which can help deliver this information not as written text – but as spoken voice – a medium which is far more accessible. Indeed, speech is a far more powerful medium to communicate a message than text – for while only half of India may be able to read or write and just about 5% of people conversant in English, practically every person in the country is able to understand his or her native language.

Being a speech enabled solution was not enough – for the information to have value - the solution needed to be designed so that the instant availability/ updates of information should not be lost. In addition, it was required that the implementation should be cost effective and hassle-free, ensure real-time processing of received text input and not add any complexity to the reporting process. Finally, the solution needed to keep in mind the target resources from which this would be accessed and ensure that no additional demands (in terms of bandwidth, hardware/ software requirements/ etc.) should be made on the user's end.



The Solution Proposed By Prologix

When Prologix met senior officials at the ECI and learnt of this requirement, we quickly architected and proposed a Speech enabled web based solution which aimed to enhance the information delivery mechanism and allow the illiterate / visually / print impaired be able to get this information efficiently. The solution was based on our widely acclaimed **Indian Language Text to Speech software – Vaachak** and proposed to be deployed for the first time as part of the Electoral process for State Elections 2005 – covering the states of Bihar, Haryana and Jharkhand.

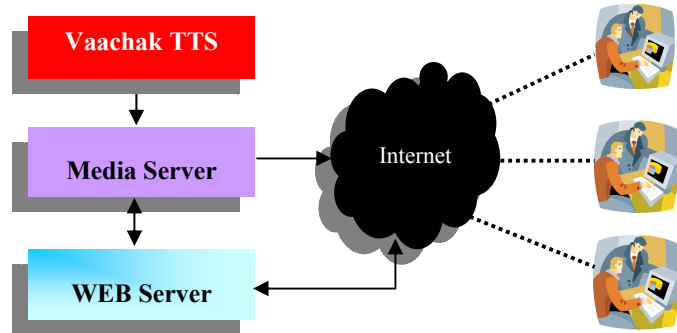
In close partnership with engineers at the ECI, Prologix developed a system which would use English and Hindi Vaachak voices to pick up the data updated in a central ECI Results database, convert it into speech automatically and stream it to users accessing the Election Commission website through a high performance Audio Streaming server.

This is the first time ever in India that a solution of this sort has been deployed using best of breed, indigenously developed technologies to aid in effectively reaching out to all segments of Indian society. In light of the significant efforts being made to enable e-governance solutions, introduce effective information delivery mechanisms and bridge the Digital divide, this implementation could serve as a model approach to cost effectively ensure universal access to information for Indians.

Solution Design

The solution implemented by Prologix was built using Windows based standards-compliant components in conjunction with Prologix's Indian language Text to Speech software – **Vaachak**.

Using a Windows IIS Server for web and media services, content was updated dynamically from the website, converted into speech in real time using Vaachak and stored in streamable media format (mp3) on the media server.



This content was updated on a regular basis to ensure accuracy of available information. On receiving a request over the Internet, the created speech files were streamed out to the users.

Prologix deployed this solution using Vaachak's specially created high quality TTS voices – *Anjali* for English and *Rakhi* for Hindi on a Windows 2000 server running the Windows IIS Server for web and media services.

This solution is accessible through the Election Commission of India website: www.eci.gov.in.

Benefits:

- **Real time availability of information in speech format:** Through this solution, information on the web is available in both textual as well as speech format. This ensures the maximum penetration of information to the target audience.
- **Availability of information in both English and Hindi:** The solution uses advanced, natural sounding text to speech voices in english and hindi to read out the text. This ensures that the maximum audience is covered for information delivery.
- **Complete automation ensures hassle free implementation:** The use of Text to Speech software which converts given text into speech automatically removes the need for any



manual recording. Once deployed, this solution can thus continue to deliver benefits for many years without requiring any human intervention at all.

- **Use of Modular, web based components allows greater scalability:** The use of a standard Client-Server architecture in the application designs ensures that the solution is adequately scalable for meeting any future expansion requirements.
- **Open-standards support for convenient integration:** Vaachak has been designed to support SAPI – a leading Speech standard from Microsoft. In addition, the speech files generated by the engine were in mp3 format. This ensures that these can be streamed out to the widest collection of mp3 players – from Windows Media Player to Winamp, to Real Audio Player, etc.
- **Use of standard – off the shelf technology lowers implementation costs and time:** All components deployed in this solution were standard off the shelf products. Use of these components enabled us to design, develop, test and deliver the solution to the customer in no more than 15 days!
- **Streaming solution lowers bandwidth required at client end:** In keeping with the philosophy of minimal user disturbance – a streaming server approach was created. This enables all the speech processing to happen centrally, and the speech files to be streamed out to the user. This reduces the bandwidth required to be just about 16 kbps (which is easily available over a telephone line), and places no restriction at all on the kind of computer that the user could choose to access the application with.

For more information on how Prologix and Vaachak can help you reach out to India and Indians:

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