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# Service Guidelines of Public Meeting's Webcasts: an Experience

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**Abstract.** In Italy, public meeting webcasts are frequently adopted by local public administrations to support the “information provision” process. This is supposed to increase the citizens’ awareness and participation to public life. In the paper, the experience gathered from the design of both the architecture of a webcasting system and the “webcast’s production and distribution process” is presented. The system implementation is discussed referring to a large Italian Public Agency.

**Keywords:** Webcasting, information provision, broadcasting of public meeting

## Introduction and Background

In a transparent and accountable Public Administration critical decisions are often deliberated during public meetings. These meetings are based on strict rules and their detailed agendas must be published prior to the meeting date, together with related documentation, to allow all interested citizens and administrators actively participating.

Actually the advent of eParticipation has changed the meaning of Government transparency. Historically, the definition sounded like “show us what you have done”; however, this leaves citizens and the media with the less than ideal option of complaining to or complimenting the government after the fact. According to the main goals of the EU policy defined in the eGovernment Action Plan 2006, an alternative and more appropriate definition was created: “let me participate in what you’re doing as you’re doing it”. This new definition leads to two main approaches [14]: the first type simply provides a central source for information about the government and its activities. An example for this kind of initiative is government websites. The second type, based on Web2.0 technology, make massive text-based, audio, and visual records of government activity (meetings of Community groups, Parliamentary debates, or Council Committees) available to citizens’ computer screens (i.e. Webcasting). Webcasts can be viewed in real-time (live Webcasts) or they can be archived to let people watch them at a later time (on-demand Webcast).

Alas, this “movie-like” approach is not practical if videos are longer than 10-15 minutes. Net-citizens, in fact, are accustomed to Web browsers and search engines for

surfing and retrieving “fine grained” multimedia contents (like in YouTube), in contrast with the “coarse grained” scenario of many Council meetings and Parliamentary debates, whose videos can last even several hours. Obviously, large video sequences can be cut and annotated with titles and short description or even minutes and translations, to better support the “Web approach” based on search, click and surf operations. Actually the topic of video annotation is not new in the research literature, where a huge number of tools have been developed and described [1-9] to make them searchable also on the Web. These tools have evolved from simple text annotators to semantic tagging systems for online communities to produce rich, structured metadata and annotations based on standard mark-up languages [4, 6].

The application of these tools and techniques to improve the transparency is very promising but, in general, it is not sufficient to transform the movie-oriented digital meetings into media-rich applications valuable to Net citizens and e-participation [10]. Indeed the quality of the annotations depends on many factors, like the granularity (the average length of the atomic videoclips) and the definition of a suitable standard for metadata: this topic is a hot issue in eParticipation research, due to the unsustainable variety of non-standardized and proprietary formats used by each public agency for publishing its own information [12].

The overall quality also depend on the “production process”, and in particular on the definition of a “validation and publishing procedure” based on a pre-agreed thesaurus of terms and phrases used from the indexers. A further requirement is about accessibility, in order to support the eParticipation of citizens with disabilities.

Various research and industrial tools have been analyzed which annotate video fragments, deliver webcast (both live and on-demand) video/audio contents, arrange contents or add accessibility features to existing multimedia content [16], but to our knowledge there is no integrated platform supporting all the previous features in the transparency perspective and which also provides the following:

- support an approved thesaurus and an agreed set of rules for annotating the video/audio recordings or adding appropriate metadata to digital documents or public meetings minutes
- workflow for content validation before its online publication
- searchability of public meeting webcasts by Web search engines
- ability to produce statistics (indicators) about the politicians participation to the public meetings, the time spent for each topic, etc.

In addition to these functional objectives, other important requirements include ease of use, simplicity, minimal learning curve, low cost of implementation and maintenance, the adoption of standard formats and protocols for digital encoding, storage and transmission. The aim of the VIEW system here described is to satisfy all these requirements, and to describe its implementation in a large Italian Municipality.

The structure of the paper is the following: the usage scenario is presented in section 2. The system architecture and main technical aspects are presented in section 3. A description of the user interface is given in section 4. Section 5 is about the evaluation of VIEW in a real case and Section 6 is for conclusions and future works.

## **The usage scenario**

Italy is a large, southern European country with a strong, growing economy and a high level of internet usage, especially amongst the younger generation. It is also a country with a heavily bureaucratized, multi-tiered, semi-federal government.

The population density ranges from extremely low in the countryside to extremely high in the urban areas. Thus, local eParticipation initiatives in Italy have many demographic backgrounds against which to be set.

The Italian government is divided into 4 levels: a Central Government, twenty Regional Governments, 110 Provinces and about 800 Municipalities.

This level of government enjoys a fair amount of autonomy in decision-making as well as significant financial support from higher levels of government.

In this scenario the issue of providing local authorities with transparency Web tools is a big challenge. Even if Web technologies provide means so that the government's critical decisions must be deliberated on and made during public meetings (e.g. Municipal Councils) or hearings and these public meetings must be accessible to anyone and everywhere, live and on-demand, Government agencies have always seen making public records accessible as an extra step or job, to be done off-line after the Council. This is the main reason why a system enabling annotating video/audio records during the public meeting process, is considered critical for improving servant efficiency and effectiveness. The scenario envisioned is that of a system able both to live broadcast public Municipal Council meetings and to provide remotely located administrative jurists (indexers) with a client for real-time annotating the broadcasted video.

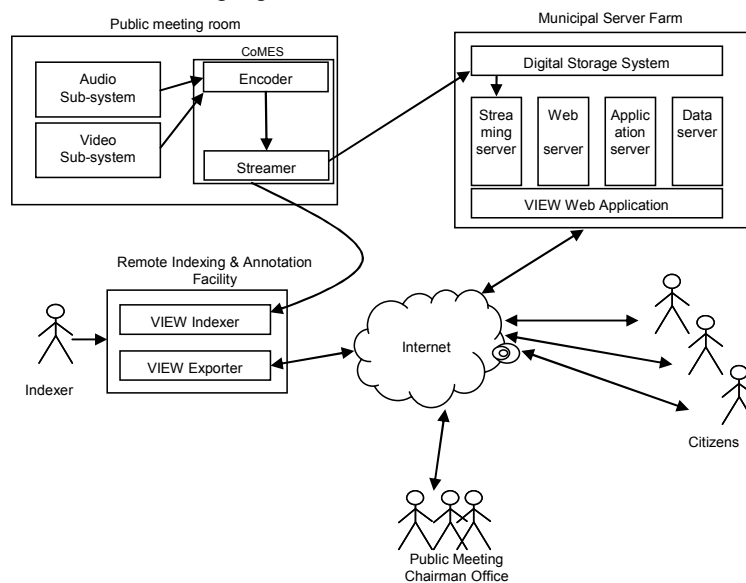
Indexers' tasks are to create the meeting agenda, to link it with the corresponding video fragment and to attach related documents (minutes, annexes, reports, etc). During the live event, the indexer can add the speaker's name, the topic, start and stop time, his/her political party, his/her role in the meeting (Major, Meeting chairman, external guest). The system must contextually support indexers, for example, by automatically completing the speaker's name, the topic or political party thanks to a preloaded vocabulary preventively agreed with the meeting chairman. Once the meeting is over and the integrated public record is saved, the meeting chairman is notified by email. He accesses the pre-staging area, validates annotations, hyperlinks and attached documents and publishes the item. Once the new content is online, citizens can browse public meeting using the navigation tree displaying the agenda and the speakers for each topic or using a general purpose search engine to look up speaker, topic or any other specific annotation inserted by the indexer. The search engine retrieves the web page with the whole annotated video, then the user can refine the search filtering by dates, time intervals, speakers and subjects, in order to retrieve the specific video fragments.

## **VIEW: System Architecture**

VIEW is an information system allowing:

- the live and on-demand webcast of multimedia content

- the real time annotation of videos and the addition of files,
- the definition of a standard vocabulary, validated by the Council Chair and used by the servants during the real time video annotation
- the validation of the multimedia objects before their online publication
- the retrieval of these multimedia objects by Web searches (i.e. Google, Yahoo, etc.) and a detailed search, based on SQL queries, once the user on the Municipal portal



**Figure 1:** VIEW architecture

The synchronization system is based on timestamps added on the continuous media, which tag the video and allow the linkage among the video, the annotation and the other documents. The whole system has been implemented with Microsoft technologies (VB.NET and ASPX.NET, using the .NET 2.0 Framework) and is made up of three main modules. The “public meetings room”, in the upper left corner of Figure 1, provides the continuous media source (audio and video streaming) from the meeting room. The CoMES (Continuous Media Encoding and Streaming) component encodes audio and video streaming and synchronizes the local clock with those at the Remote Indexing and Annotation Facility to guarantee a unique temporal reference. The outcome streaming is sent both to the digital storage facility, via a dedicated line on the Municipal Network, for the live broadcast (via a streaming server) and to the remote indexer, via a dedicated domestic ADSL line, for annotations. The server farm, in the upper right corner of Figure 1, provides:

- the storage space for 5 years of digital meetings (4 TB on line plus a tape unit for automatic backup);
- the media server ( a local MS Media Server on Win 2003 Server, connected to a 6 Mb/s Internet connection, plus a remote backup server, in hosting).

- the Web server and the application server (MS IIS with .NET 2.0 framework);
- the data server (a MS SQL Server 2005 with full text extensions);
- the VIEW Web platform, which includes the following features:
  1. the Citizen Front End, serving the live meeting interface, the on-demand interface (archived public meetings) and the internal search engine, to look up specific topics, meetings, speakers or associate documents;
  2. the Exporter Front End, i.e. the interface used by Indexers to prepare new indexed and annotated video according to the style guide and the publishing workflow ;
  3. the Meeting Chair Front End, used to modify, approve and publish each meeting.

The Remote Indexing & Annotation Facility, in the lower left part of Figure 1, is based on two main applications, the VIEW Indexer and the VIEW Exporter (both developed in VB.NET). The Indexer and the Exporter are used to annotate the continuous media coming from the public meeting with the metadata agreed with the Meeting Chair (i.e. the speakers' name, its role in the meeting, the name of its political party, the exact start/stop time and the subject of the speech), using the vocabulary previously defined, and to link it with the relevant documents (minutes, agenda, annexes etc. ). The Exporter is in charge to pack each new group of metadata, to send it to the server farm and to install each part (html pages, temporal indexes, annotations, attached documents, minutes, ...) in the corresponding farm component.

The video player embedded in the Web interface is the Microsoft Media Player and the synchronization between the tree elements (topic/subtopic/speakers) and the audio/video fragments is based on a purposely-developed multibrowser javascript library and on the adoption of the .asx metafiles (Microsoft advanced stream redirector and markup language) suitable to extract and browse "on the fly" specific video fragments from continuous-media streams, just relying on temporal coordinates (like start-time, stop-time, length etc.).

The same features are also developed with:

1. the Smil markup language together with the Quicktime-Server/Quicktime media-player (from Apple) or the Real-Server/RealPlayer (from Real Media);
2. the Flash runtime plugin and the ActionScript programming language together with the Flash Media Server (from Adobe).

Even if VIEW fully supports both technologies, the diffusion of the Microsoft Media Player and the low cost of the Microsoft Media Server are very attractive for many public agencies. Other similar or newer solutions based on the ogg vorbis or on the MPEG-4 video formats and on various markup techniques like CMML, MPEG-7, RDF etc. are under analysis and evaluation.

In order to implement the searchability of annotated video meetings, VIEW generates contents that can be retrieved both by Web search engines (like Google or Yahoo) and by an internal specialized search engine. The double support is achieved thanks to the introduction of a little redundancy: static .html pages including all metadata, temporal markers and text annotations are created for all archived meeting. These pages are crawled and indexed by all the Web search engine, but the granularity of the retrieval is the whole public meeting. Then, the internal VIEW search engine can be invoked, to refine the answer. The internal search engine is

based on a purposely-designed relational data model including speakers, their politic parties, their role in the meetings, the date and hour of each meeting and speech and its topic; the database is able to track all the changing aspects (party, role, name, sex, ..) of each speaker, and to periodically extract statistics about the time spoken by each party, the respect of the time limits, the most discussed topics (in terms of time spent and number of speeches) etc. The adoption of free runtime distribution of the MS SQL Server 2005 with the full-text extensions enables most of the advanced linguistic features (extended query language, stemming algorithms, stop-word elimination, domain-specific dictionaries, double-word and multi-word identification, ...) typical of all modern search engines.

## User Interface

As shown in Figure 2 and Figure 3, the main application layout for citizen's interface is based on three panels. They are framed by a rectangular area on the top (for the main navigation and the search engine) and a lateral grey part, which are due to the Institution communication style guidelines. The left panel contains the meeting agenda represented as a tree of topics, nested subtopics and speakers' names. Each speaker (i.e. each leaf of the tree) is linked to the corresponding speech (audio/video fragment), displayed in the upper part of central panel, while in the bottom part, minutes and short descriptions are visualized, if available. The related documentation (like the planned agenda, the .pdf documents) is visualized at the bottom of the right panel. The upper central bar is for breadcrumb trails, status information and archive searching. Figure 3 shows the result of a "simple research". The left hand panel has been substituted by a speeches' list coming from the search engine while the upper part of the right panel contains a set of fields for search refinement.



Figure 2: The layout of the main page of VIEW

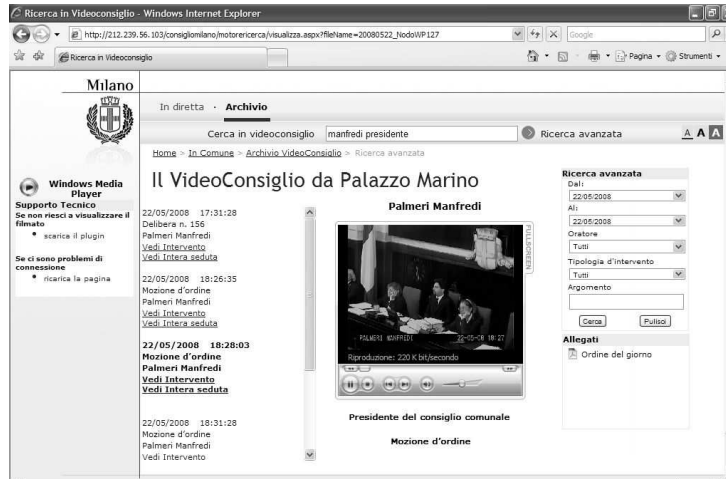


Figure 3: the result of a “simple search” action

The creation and modification of a digital public meeting is possible through the main interface of the Indexer, displayed in Figure 4. The indexing/annotation session starts together with the meeting’s live broadcast. From that moment on, it is possible to create the detailed agenda (as a table of contents) adding and linking the annotations (topics/subtopics, speakers’ name, start/stop time, attached documents, ...) to the video clip in real-time. At the end of the meeting annotations, links, temporal markers and attached documents are used to create both:

- the static web pages constituting the archive (Figure 2);
- the relational data structures stored in the database which will enable the advanced search options (right panel, Figure 3) .



Figure 4: VIEW Indexer - main interface



Accessibility for disabled peoples is taken into account through high-contrast and character-magnified interfaces (upper right icons in Figure 2 and Figure 3).

## **Evaluation**

The motivation of VIEW can be summarized in the following points:

1. to minimize the cost, the effort and the time required to transform a public meeting in online eParticipation event;
2. to maximize the searchability of the multimedia contents produced and the easiness of use;

VIEW is not a general purpose authoring environment to create hypervideos, but it is a specific, optimized platform for the large community of government agencies interested in fostering efficient transparency in eParticipation.

We chose two specific case studies to evaluate the system. We identified these case studies on the basis of existing established collaborations with two public Institutions, a big Municipality in the Lombardia Region and a local agency of Apuglia Region.

This first case study involved a 12 months collaboration with the chairman's office of the City Council, in charge of documenting and publishing activities concerning the Council public meetings. The collaboration aimed at tuning the public meeting annotation and publishing process up and to analyze the gap with another publishing system used by the office in the previous five years.

The second case study concerned an eParticipation initiative of Apulia Region, involving specific communities (some thousands of citizens) to discuss and reformulate three important regional laws about sport, health and urban organization.

Both the case studies are based on the use of VIEW, which was used by public servants for acquiring, annotating and publishing the meetings. In both the cases the test was preceded by a training session (8 hours in a 5 people class) during which after a session of presentation of the platform, servant were invited to try the platform. The trainers included a jurist, explaining the legislative and administrative foundations of the platform, a functional analyst, who described the use of the system and a usability expert, in order to qualitatively observe how the class should have interacted with the platform and discover usability and interaction bugs. The general feedback was positive both on the layout and navigation design and on functional aspects.

In the case of the City Council, since each officer used a personal annotation style, variable in time, inconsistent with the other officers and prone to discussions with the Council Chairman, they agreed to model the annotation procedure and to agree about detailed annotation guidelines, which have been included in the Indexer software component, as thesaurus and online suggestions to support the indexing and annotation task. This produced dramatic improvements in the time to publish each meeting, in the quality of the detailed agenda and, most of all, as a side effect, it reduced the overall time spent by the office to search information. The same relevant improvement can be achieved in each public meeting with a well defined structure, like the City Council.

Moreover the comparative analysis with the previously used system also revealed that the major advantages perceived by the users were the ability to:

1. publish each indexed and annotated meeting within few hours from the end of the event, rather than in a week or more;
2. easily associate relevant documents (agenda, minutes, annexes, reports etc.) to the published meeting;
3. perform both simple and advanced search in published meetings;
4. reduce the publishing costs from 4000 €/meeting to 1000 €/meeting;
5. increase the overall number of published meetings, and the accountability and the transparency level perceived by citizens.

The main issues they highlighted during the test and evaluation sessions are:

1. The current multibrowser support, based on Javascript, HTML and CSS, is heavy to maintain while new browsers and new browser-versions come out. A completely new, Flash-based user interface is under evaluation to overcome the problem, together with a more general, non proprietary (in the sense of multi-vendor) and stable solution
2. The officers in charge of indexing and annotating the meetings ask more and more to be enabled to use the platform via wi-fi and mobile. Anyway, frequent line interruptions and low bandwidth of mobile or domestic lines hinder this feature;
3. While is frequent the request from citizens to add social tagging tools, Municipalities are unable to undertake the burden derived by supervise public comments in the official council meeting pages.

## **Conclusions and Future Works**

VIEW is an example of tool to easily and effectively transform movie-oriented public meeting recordings into Web oriented, interactive applications for eParticipation. After 12 months of experimental usage, VIEW is a mature and stable tool, ready to be industrialized and deployed on large scale but, as for similar initiatives, we argue that the organizational structure of local administration and government agencies is not ready to accept it, while preferring home made, less-than-optimal solutions.

Our case studies revealed a range of potentials and issues that deserve further investigation. In particular, we are planning to investigate the following improvements and extensions:

1. the web user interface should become more portable and compatible with the existing and future web browsers;
2. the remote indexing & annotation facility should become nomadic or mobile;
3. the system should be extended with social tagging features, providing the officers with tools able to efficiently manage a huge amount of comments ;

4. a standardized vocabulary and formats are necessary for cross-agency search, in order to compare the behavior of different public administrations (e.g. different municipalities) on a given topic (e.g. how to organize the urban garbage collection).

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