

GLOBAL ELECTRONIC MEDIUM CONSTELLATION FOR DYNAMIC CONTENT INTEGRATION – THE GEMINI PERSPECTIVE

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ABSTRACT

The proposed paper intends to provide essential information related to the various results and the multiple perspectives of the GEMINI IST Project, as for the development, the deployment and the use of a suitably integrated mediation platform, within the specific context of digital television (DTV), able to support modern applications and innovative services, towards promoting an effective convergence effect between telecommunications, broadcasting and information technology (IT). The detailed system solution transforms the traditional value chain of the media sector and introduces a new mediator role that will coordinate the whole market by reducing the current “gap” between demand and supply forces. It promotes a new framework to sufficiently support the dynamic value constellation form or organization. Within the same context, we also discuss the fundamental system architecture as well as the basic functional components and their particular role & functionalities. In addition, we investigate the arising opportunities for the provision of four different interactive multimedia services (i.e. chatting/messaging, voting, alerting and content recommendation) developed according to the global Multimedia Home Platform (MHP) standard in parallel with the major original options promoted by the system itself. Furthermore, we evaluate possible business benefits for various categories of market players involved, and we finally conclude with estimations for further future development.

1. INTRODUCTION – GENERAL PERSPECTIVES

The GEMINI IST Project (IST-2001-33400) develops, within the context of DTV, an integrated mediation platform oriented to sport events that will fulfill viewer's demand through the use of content aggregated from various content providers in various formats, thus

exploiting the dynamic constellation form of cooperation. In fact, the system aims to exploit opportunities deriving from the convergence of different mediums (DTV, Internet, newspapers, etc.) and their ability to transfer digital content in a fast, accurate, reliable and inexpensive way.

Practically, the system understands and extends the exact viewers' needs in additional content provision. It also “enhances” a broadcasting program with interactive features/capabilities and supports the creation of *virtual communities* with similar interests.

The system can contribute to the wider European economic growth by providing a means for the initialization, development, expansion and maintenance of a dynamic constellation, delivering value to all the participants in the media and entertainment sector.

2. MAIN OBJECTIVES OF THE SOLUTION

Currently, broadcasters collect content from various content providers, then package the content (either by home production or in cooperation with “external” market players) and distribute it to the viewers. Interactive features are not widely offered, unless digital platforms are used, but even in this case the offered value adding services are limited by the availability of content upon request, mainly due to the restrictions imposed by the existing pooled and sequential relationships between the related actors.

The introduction of the GEMINI service provider will act as a “gravitation” point around which *content providers* and *broadcasters* will *constellate* in order to produce more “sophisticated” services, efficiently fulfilling and satisfying customers' needs and preferences. The main objective is to support and to extend the traditional way of watching TV, by offering an interactive, flexible and innovative viewing environment.

3. DESCRIPTION OF THE SYSTEM-PRODUCT

GEMINI is an integrated system that provides both the infrastructure and all needed software tools to support the efficient collection, management and distribution of customized interactive content, taking full advantage the capabilities of existing Internet and DTV platforms.

Coordination mechanisms are provided to support the creation of a dynamic value constellation between content providers, broadcasters and other interested parties of the DTV value chain. Techniques are provided for the automated collection, aggregation, packaging and broadcasting of all relative (to an event) content, before the beginning of a sport event.

Content provision is user-driven, based on specific viewer demand, resulting in an interactive television (iTV) program with additional features and capabilities. Content providers (e.g. broadcasters with video content, Internet portals with news and other multimedia content, sport statistics agencies, advertising companies etc.) access the GEMINI service provider and by using a specially designed form provide metadata of the existing content, in order to develop an index of the available information.

TV channels announce the broadcasting of an event and request for additional content that can be offered to the viewers (for this specific event). The system, then, generates a list of recommended content that it is most likely to match viewers demand, and gets into the phase of collection, by notifying the relevant providers about the required data/information.

As soon as the appropriate content has been identified, its providers upload it to the GEMINI server. The system initiates its content aggregation mechanisms in order to uniformly “package” each individual form of informative data, relevantly. Such an action may have as an outcome either a new end-content or logical relations between separate contents (for example, the system could aggregate an advertisement of a soft-drink with the history statistics of one team).

At the next phase the system delivers the content to the viewers upon their selection and/or fulfils their requests. Each set-top box (STB) receives data and stores it in its hard disk. A local application running on the STB generates the interface of the relevant service, based on the individual category, attributes & properties of each sport event and on the profile, preferences & requests of each viewer.

4. THE GEMINI CORE-ARCHITECTURE

GEMINI employs a modular and expandable architecture divided in two main parts. The first one refers to the back-end and supports the Dynamic Value Constellation, while the second is related to the front-end applications and describes the interaction of the system with the viewer. The back-end is an Internet-based platform providing an kind of “interface” to users, where content providers, broadcasters, network operators and other iTV key players (e.g. advertisers, T-commerce companies) constellate, in order to meet viewers’ demand for additional content of any type and format. The front-end consists of various MHP applications running on the viewer’s STB; it allows a user to provide requests and supports the delivery of content. The second part refers to the viewer and consists of MHP applications running on the viewer’s STB.

The distinct parts of the correspondent system architecture (as shown in figure 1) are listed as follows: (i) The *Viewer Management engine* handles diverse viewers’ requests and manages relevant databases containing particular viewers’ profiles and preferences; (ii) the *Content Collector engine* collects content from a variety of content providers involved in the system’s activities; (iii) the detailed *Filtering/Aggregation engine* filters and/or aggregates the collected content, based on the event that the corresponding GEMINI service also covers the viewers’ preferences; (iv) the *User Management engine* handles all range of data originating from system’s users and allows for adding, removing users or modifying existing user data; (v) the *Notice Board engine* serves as an exact “place of public information” within the entire system-entity, for both content & service providers. In fact, by means of that specific engine, these two categories of actors can interactively communicate regarding forthcoming events, they can receive ideas from the system administrator, can review public available usage statistics, etc.; (vi) the *Target Group engine* is responsible for managing predefined target groups. This enables a GEMINI service provider to fully define and manage explicit target groups, by identifying fundamental parameters like “favorite” sport, “favorite” team/athlete, gender or age; (vii) the *Messaging engine* is developed as an MHP “plug-in” application to the system and provides the viewers a means of communicating with each other; (viii) the *Application Server*, is a module, aware of the target platform and the network operator environment. It holds the executables and the data of the target platform and schedules them for delivery to the network operator. The application running on the viewer’s STB provides the means to download and execute applications from the air. It stores locally data and applications to be accessible off-

[illegible]

5. GEMINI SERVICES & APPLICATIONS

The system introduces several value-adding services to the consumers, providing access to a large repository of (re-usable) content, based upon viewer's requests and needs. The application will cover the ground in additional future services related to provision of content, *in any form*

In a fully competitive environment as the global digital broadcasting & communications industry, the goal is not as much to create value for customers (viewers) but also to mobilize them to “create” their own value, by exploiting current service offerings. The system promotes an interactive consumer environment, by enabling the provision of personalized content to viewers; the latter are able to select and access “rich” and enhanced forms of content, also including a variety of on-demand features (like statistics, full biographies of players/athletes, in-depth background material on the teams or even the history and milestones of the favorite team).

GEMINI offers four different distinct categories of services, developed according to the international MHP standard. These services, which can be marketed through licensing to the potential customers, are alerting, content recommendation, voting and chatting/messaging. They can be either synchronized (in context) with the current broadcast or even permanent. Experience and expertise on DTV networks technologies will be particularly useful for consulting, training, engineering and support services, since the demand for such services is expected to dramatically rise.

Chatting/Messaging is the most interactive service within the system, as it invites an individual viewer to express his/her opinions and share them with rest of the viewers, thus performing an almost real-time and fully

interactive dialogue. Viewers can exchange ideas, opinions and make discussions through their TV set, either communicating with a friend, a group of friends or by taking part in an open TV-chat. The viewer types messages by using an STB remote control, a virtual keyboard on the TV screen or by using a mobile phone. This service can exploit most of recent global convergence's aspects, by taking into account (or even by promoting) an "optimum" possible use of different "platforms"-infrastructures, existing facilities and/or terminals, through suitable interconnection and interoperability terms.

Voting is the most impulsive action and kind of service within the system. The viewer is prompted to actively participate in a special sport-event he is watching, by answering several questions related to it. At the same time, broadcasters have the opportunity to ask for the viewers' opinion with the final goal of identifying *-and then suitably broadcasting-* the more interesting sport events, according to audience preferences. Viewers get the feeling that their opinion is heard and that they play a critical role in the sport events projection value chain, while broadcasters and content decision makers maximize their revenues by always offering the most popular and wanted program.

Similar to the Alert service, the *Content Recommendation service* will be anchored to the sport profile of the viewer, in order to suggest additional content. The system locates content close to the profile of each viewer and stores it to his/her STB.

6. INNOVATION OF THE SOLUTION

The entire solution is an innovative platform, built on advancing state-of-the-art technologies in the area of content management, DTV and iTV applications. In this context, the system differentiates itself from competitive products by: (i) Offering an open and expandable architecture, compatible with recent standards like DVB-MHP, to ensure the interoperability between various provisions of content; (ii) developing iTV applications in next generation STBs (allowing interaction with users) with processing power, memory (RAM) and permanent storage capabilities; (iii) supporting open metadata and content referencing standardization efforts (e.g. as it is described in the context of the TV-Anytime Forum). A suitable schema will be developed for portably representing metadata across material of different types; (iv) creating flexible XML/XSL definitions for content description, for the deployment of an effective content indexing mechanism, addressing issues like automatic extraction of metadata, fuzzy matching of multimedia

content against dynamic requests, automatic grouping of content into separate areas, multi-linguality, and dynamic relevancy feedback mechanisms; (v) establishing of a design and test model for the analysis of viewer preferences (based on statistical or other appropriate techniques), to notify the users for the existence of relevant or updated information; (vi) exploring collaborative filtering and other data mining techniques, as a suitable mechanism for creating recommendations to the viewer, within the framework of the proposed dynamic constellation model and; (vii) providing innovation in the design of usable users interfaces taking into account differentiating characteristics of the TV medium (display size of monitor, bandwidth available for the return channel, lean back attitude, multiple viewers at the same time) to optimize the TV experience.

7. EXPECTED BUSINESS BENEFITS

The GEMINI solution offers major business benefits of the dynamic constellation among the involved parties, in several ways and with several forms. We discuss benefits for separate groups of markets players, as listed below:

Content Providers can expand their business by participating in dynamic (virtual) market places and by fostering relations with additional actors-broadcasters. They can also obtain additional/alternative distribution channels of their content, besides the "traditional" mediums like newspapers and Internet, without compromising copyright protection. Furthermore, they can get maximum return on their investment through the reuse of content and through the extension of its life cycle. They can also monitor content demand and plan more effectively future production of content to support the actual market needs. In addition, they can enhance their way of delivering content by offering more specific and in-context material. They can try to adapt and specify interactive digital products and services for highly specific target markets (i.e. strong customization option, which is a supply-side product strategy).

Broadcasters usually collect, select, package and schedule content for viewing at set times. They can extend their traditional co-operations with content providers and gain access to content difficult to obtain so far, as well as to expand capabilities in the most promising area of interactive services. They can find new solutions on how to exploit the content in different ways, and on how to move from mass-market to customized or niche challenges. They can also enhance their existing digital infrastructure by providing innovative value-added services, whereas they can obtain an alternative channel to reach their viewers and identify their preferences, so to

provide tailored services to their customers (i.e. wider choices, added value and more scope for interaction). In addition, they can satisfy the content demands of a digital interactive TV network.

Network Operators practically offer the bandwidth in order to transmit (or in some cases to monitor and/or even to control) content to customers or audience. They can achieve higher utilization of their networks by enabling multimedia content services over emerging devices like next generation DTV STBs built on open standards (e.g. like DVB-MHP). In some cases, when they are aware of content, they can also be service providers as well. The entire perspective offers more opportunities/benefits through wider market penetration, especially in a competitive environment.

8. CONCLUDING REMARKS

It should be expected that the wider development of the Information Society technologies would contribute to the transformation of the digital-based economy at global level, especially via the introduction & the effective penetration of new services and/or relevant facilities. Of significant importance would be considered some specific applications, able to harness new market dimensions and to promote possible forms of horizontal collaboration(s) in a fully converged environment.

GEMINI offers a broad potential to be exploited by the market sector, as it provides a convenient and promising means for realizing business activities. Furthermore, it covers a great range of commercial interests, mainly referred to network operators, broadcasters and content/service providers.

Simultaneously, the proposed system broadens and enhances a variety of opportunities for users, as it practically contributes to meet targets related to their preferences/interests (e.g. business, entertainment, informative and more). Consumers can receive personal recommendations based on their individual preferences and participate in pre- or post-event developed virtual communities of people with similar interests. In general, consumers want to relieve information from diverse sources in a customized format, as well as to obtain knowledge and entertainment from compelling applications, which are cost-effective and easy-to-use.

However, commercialization of the entire system-product needs a deep insight in aspects like market trends and characteristics, product finalization and competitive advantages, pricing policy, financial analysis of necessary recourses and potential return on investment, before

entering the market. It should be estimated that *-under suitable terms and within a fully competitive and liberalized market environment-* GEMINI applications could contribute to the evolution of modern markets, especially in the sector of interactive multimedia services.

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